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VOLUME III

A HISTORY OF THE UNITED STATES ATOMIC ENERGY COMMISSION 1952-1960

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CHAPTER 1
A SECRET MISSION

It was almost nine o'clock on a rainy November morning in 1952. Remnants of a heavy ground fog still clung to the sodden terrain of the Augusta National Golf Club in Georgia. Two men in the rear seat of a nondescript sedan watched anxiously as the driver felt his way over the narrow road to the clubhouse. The fog might have seemed a convenient cover for what was a highly secret mission, but in fact it had almost prevented the travelers from making their appointment. As the car stopped at the clubhouse entrance, the two men hurried inside. After a brief conversation one of them was given a seat in the manager's office, a small room on the ground floor. He was Roy B. Snapp, the secretary of the United States Atomic Energy Commission. His mission was to brief General of the Armies Dwight D. Eisenhower, who seven days earlier had been elected President of the United States.

Snapp was a natural choice for this delicate assignment. As secretary of the Commission he was privy to the most closely held secrets of the nation's atomic energy program, those sensitive and sometimes extraordinary bits of information that were reserved for the five Commissioners themselves. As a naval officer in World War II, Snapp had been deeply involved in military intelligence and planning when he served with the secretariat of the Joint Chiefs of Staff. At the end of the war he was special advisor to Brigadier General Leslie R. Groves, who had spearheaded development of the atomic bomb in the Manhattan Project. He had organized the Commission's secretariat in 1947[1] and was also serving as liaison officer with the National Security Council.

While waiting for the President-elect to arrive, Snapp had an opportunity to compose himself after the harried flight from Washington. The heavy fog had sent the small commercial airliner on a circuitous route, which terminated in Columbia, South Carolina rather than Augusta. Fortunately Bryan F. LaPlante, the director of the Commission's Washington security operations, had accompanied him and was able to keep in touch with the Commission's Savannah River Operations Office near Augusta. Prompt dispatch of a government car had made it possible for Snapp to keep his nine o'clock appointment with Eisenhower. He also had time to reflect on the incongruity of the situation: a meeting with the future President in this small unpretentious office with carefree golfers on vacation chattering and joking just outside the two open doors leading to the room.

A few minutes later Snapp heard familiar voices in the hall outside. Suddenly he realized that he had a pistol under his jacket for safeguarding a top secret document he was carrying. He leaned around the doorpost at the rear of the office and alerted the Secret Service agent. By the time the agent had reassured him that "we're all carrying guns," Eisenhower was in the room. He recognized Snapp from his visits to the Joint Chiefs' headquarters in Washington. As Eisenhower took a chair at the manager's desk, Snapp seated himself at the general's elbow.

Before Snapp could open the double envelopes containing his top secret message,[2] Eisenhower launched into a discussion of atomic energy. The President-elect said he had been talking with Charles A. Thomas, president of the Monsanto Chemical Company, who had suggested that private industry build nuclear reactors that would produce both electric power for commercial purposes and plutonium for weapons.[3] As a wellknown industrialist with a first-hand knowledge of nuclear technology, Thomas could command attention within both the new administration and American industry. Now, six years after the Commission

had assumed responsibility for the nation's atomic energy program, industry was becoming restive over the delay in realizing the commercial application of nuclear power. While most of the nation was preoccupied with the election campaigns during the autumn of 1952, a clamor for a greater role in the development of atomic energy was rising among power equipment manufacturers and the electric utility industry.

Eisenhower quizzed Snapp on the feasibility of Thomas' proposal for a dual-purpose reactor. Completely unprepared for this line of questioning, Snapp had heard enough about the idea during the preceding year to assure Eisenhower that the Commission had considered Thomas' suggestion. In large part, the feasibility of dual-purpose reactors depended upon whether the military services increased their requirements for nuclear weapons. Without going into details, Snapp reminded the general that the Commission's existing production complex, plus the very large additions then under construction, would provide a truly impressive capacity. Only in recent months, when this larger capacity was nearing reality, had a dual-purpose reactor become feasible in a technical sense.

At this point the general philosophized a bit, declaring that his approach to government was that in economic matters private industry should do as much as it could. Snapp assured him that the Commission expected private industry to take the lead in developing civilian nuclear power. The Commission, in Snapp's opinion, was already vigorously pursuing the development of nuclear reactors for a variety of purposes. Work was already well advanced on nuclear propulsion systems for submarines and naval ships. Snapp also pointed out that many of the nation's largest corporations, including du Pont, General Electric, Union Carbide, and Westinghouse, were engaged in operating production facilities and laboratories for the Commission. Snapp wanted to remind Eisenhower that under the Atomic Energy Act of 1946 the Commission was still required to maintain ownership over all nuclear facilities and fissionable material, which was used to fuel reactors. Unless the law were changed, it would be difficult for industry to have a major role in nuclear development.

By this time, however, Eisenhower's mind was moving in other directions. He was reading the top secret memorandum that had required the special security precautions which LaPlante had arranged for the mission.[4] The memorandum, from Gordon E. Dean, the chairman of the Commission, related the extraordinary developments which had occurred during the nuclear weapon tests then being conducted by the Commission and the military services at the Enewetak[5] proving grounds in the Pacific. So awesome was the information that President Truman had asked Dean to convey the news at once to Eisenhower. "The significant event to date," Dean wrote, "is that we have detonated the first full-scale thermonuclear device," which for security reasons the Commission referred to as Mike. Snapp predicted that the United States would not have a deliverable thermonuclear weapon for at least a year. When Eisenhower asked why, Snapp explained in deliberately oversimplified terms that Mike had been designed as a scientific experiment to determine whether heavy isotopes of hydrogen could be "burned" in the fusion process. The experiment required a large device, many times bulkier and heavier than could be carried in a bomber, plus extensive associated equipment.

What made Mike exceptional was the awesome power of the fusion reaction. Scientists at Enewetak estimated the blast as equivalent to more than ten million tons of TNT, or five hundred times the power of the fission weapon that devastated Hiroshima. "The island of the Atoll," Dean wrote, "which was used for

the shot -- Elugelab -- is missing and where it was there is now an underwater crater of some 1500 yards in diameter."

Eisenhower paused to contemplate the significance of these gruesome statistics. He was troubled about the growing power of the nuclear weapons which were being added to the American arsenal. He favored scientific research and understood the scientists' interests in developing more powerful and efficient weapons, but he thought there was no need "for us to build enough destructive power to destroy everything." "Complete destruction," he said somewhat enigmatically, "was the negation of peace." Certainly the United States needed enough force to counteract the Soviet threat, but he did not fear the Russians and he did not think this kind of fear should influence American foreign policy.

As Eisenhower read on, he paused occasionally to ask Snapp for an explanation of a technical term. He was reassured to learn that the Commission had so far released no information about Mike. In fact the weather had cooperated by keeping the remnants of the mushroom cloud over the Pacific for seven days, thus making it difficult for the Soviet Union to obtain samples and determine the nature of the explosion. Some information about the test, however, would inevitably leak out, if only because of the size of the detonation and the fact that the flash could be seen for several hundred miles. The large number of military personnel and scientists involved in the Mike operation would also result in some leakage of information about the test. There had already been a speculative story reported in Los Angeles to the effect that the United States had detonated a hydrogen bomb. The Commission had decided, however, to issue no statement about the test until the entire series was completed. Then the Commission would release only the cryptic words used after the 1951 series: "the test program included experiments contributing to thermonuclear weapons research."[6]

This proposal disturbed Eisenhower. He saw no reason to tell the Russians anything about the tests. Only when Snapp had assured him that the statement would be exactly the same as that used in the past did Eisenhower relent. Then in a reflective way he added that one of the greatest problems in the military services was that they all wanted to publicize their accomplishments. He thought it was a crime that air space reservation maps for the Commission's Hanford plant and other installations had been issued to the public.

The last portion of Dean's letter informed Eisenhower that the Commission had prepared a top secret report describing the stockpile of nuclear weapons, the organization and operation of the agency, relationships with the President, the Department of Defense, and the Congress, and a summary of current problems facing the Commission. Eisenhower expressed a strong interest in this information, but he observed that he would have no place to store classified material until he set up his office in the White House. In place of the written report he suggested a briefing by the Commissioners, preferably in New York since it would be "very awkward" for him to be in Washington before the inauguration. When Snapp assured him that the Commissioners would be glad to go to New York, Eisenhower called his secretary and scheduled a two-hour meeting for the morning of November 20 at his temporary headquarters in the Commodore Hotel.

Snapp had completed his mission, but the relaxed President-elect had still more questions about the Commission's facilities. Snapp described the complex production chain from uranium ore to finished metal. The expansion program, Snapp stressed, was a truly ambitious commitment on the Commission's part, one that did involve some risk. The Commission at that time had assured supplies of

uranium ore sufficient to satisfy only half the capacity of the production chain when the expansion program was completed.[7]

Eisenhower was obviously pleased. He observed that he had always had a high regard for the Commission. He thought the present Commission under Gordon Dean was doing an excellent job and he looked forward to the meeting in New York. The Commission's program involved some of the most difficult and far-reaching issues facing the new administration, and Eisenhower intended to give it high priority. His interest in the Thomas proposal showed that he recognized the peaceful potential of nuclear power. Although he accepted the key role of nuclear weapons in national defense, he did not overlook the enormous dangers which the existence of the nuclear stockpile posed. From Snapp's comments about the size of the Commission's budget and the growth of the stockpile, Eisenhower detected the fact that nuclear weapons were relatively cheap and were getting cheaper. He expressed to Snapp his concern that some junior officer might decide that they could be used like other weapons. To Snapp such a statement carried special weight when it came from one of Eisenhower's background.

The first thing Snapp did after the meeting was to burn the top secret document. On the plane back to Washington he tried to jot down the details of the conversation. Immediately after his return he would have to report to the Commissioners and begin preparations for the briefing in New York on the following Wednesday.

Dean was encouraged by Eisenhower's reaction to his letter. He understood how important it was for the President-elect to understand the Commission's activities and especially its role in policy formulation. Dean had cut his teeth as a Commissioner on the painful decisions that followed the detonation of the first Soviet nuclear device in August 1949. In formulating a response to the Soviet challenge Dean had demonstrated his ability for clear thinking and independent action. Although a majority of his colleagues opposed accelerating development of a thermonuclear weapon, Dean had come to the conclusion that the project was imperative, if regrettable. With Dean's support, forces in Congress and the executive branch convinced Truman to make his historic decision on January 31, 1950 to give the thermonuclear weapon top priority.[8] In addition to being a law professor, Dean had served in the criminal division of the Department of Justice during the New Deal years and as executive assistant to two Democratic attorneys general. The fact that he had been a partner in a Washington law firm with the late Senator Brien McMahon, chairman of the Joint Committee on Atomic Energy, also explained his appointment to some veterans of the Washington scene. Dean, however, had justified the confidence the President had expressed in him by appointing him chairman in the summer of 1950. Dean had proved himself an uncommonly able administrator, one who could find his way through the snarls and snags of controversy that entangled the Commission and come up with reasonably clear policies. He could also hold his own with cabinet officers and the President's staff. But with Republicans in control of the White House and the Congress, Dean's power was in eclipse. He expected to leave the Commission when his term expired on June 30, 1953, if not before.

In preparing for the New York meeting, Dean relied upon Snapp and Edward R. Trapnell to gather materials from the staff. Trapnell had worked in Washington as a newspaper reporter and government public information officer before World War II. He had entered the atomic energy project in 1945 as a public relations adviser to General Groves, had helped to set up the Commission's public information staff in 1947, and took charge of congressional relations in 1952.

With all the charm of a Virginia gentleman, Trapnell could use his excellent knowledge of the Commission to accomplish the most sensitive of missions.

Because he had heard of Eisenhower's preference for terse, graphic presentations, Trapnell elected to prepare a briefing book that would summarize the essential facts on large poster cards for the new President.[9] Early in the presentation Trapnell included a budget summary, which in billions of dollars looked like this:

Fiscal Year	Atomic Energy Commission	Department of Defense
1951	$2.0	$47.8
1952	$1.6	$61.0
1953	$4.1	$52.1

Trapnell placed on the same display card the explosive equivalent of the nuclear stockpile as it had existed at the end of World War II, as it stood at the time of the briefing, and as it was projected for 1956 and 1966. The top secret figures supported Eisenhower's observation that nuclear weapons were relatively cheap and getting cheaper.

Other charts explained the principal features of the implosion type of fission weapon as consisting of a spherical core of fissionable material (either plutonium or uranium 235) surrounded by concentric spheres of natural uranium and high explosive. The latter consisted of shaped charges or "lenses" of different kinds of explosives so designed that the shock wave initiated on the outside of the weapon would uniformly implode the core and set off the chain reaction. A chart of the six weapon types then being produced for the stockpile revealed that the yields could be varied by changing the nuclear components. Because the recent test of the thermonuclear device was considered the most sensitive bit of information on weapon development, the chart showed only that Mike was 20 feet high, almost 8 feet in diameter, and weighed 82 tons.

Another chart presented a simplified version of the vast complex of plants and laboratories that produced the stockpile. There were the uranium mills and sampling stations, the feed material plants, the huge reactors for producing plutonium and tritium, and the mammoth gaseous-diffusion plants for producing uranium 235. Oak Ridge fabricated the uranium parts for weapons while a new Commission facility in Colorado finished the plutonium parts and assembled the nuclear cores for weapons then in the stockpile.

The nonnuclear components were produced by contractors and suppliers too numerous to mention in the Eisenhower briefing. But Trapnell's chart did include the plants at Burlington, Iowa and Amarillo, Texas, which produced the shaped charges of high explosives; the Mound Laboratory at Miamisburg, Ohio, which manufactured the high-explosive detonators and neutron initiators; and the plant at Kansas City, which assembled most of the mechanical and electrical components. Overseeing the entire weapon production chain were the Los Alamos Scientific Laboratory and the Sandia Laboratory, both in New Mexico, which were responsible for all research and development of nuclear and nonnuclear components, respectively. The chart did not even mention the new weapon laboratory at Livermore, California, which with Los Alamos would conduct all tests of new weapon designs at both the Pacific and Nevada sites.

For at least five years, if not from the very beginning of the Commission's existence, the production of fissionable materials and nuclear weapons for military purposes had been the primary mission. But the Commission also had

NOTES

1. Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. II of A History of the U.S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), p. 317 (hereafter cited as Atomic Shield.

2. The following account of the meeting is based largely on Snapp's undated memorandum to file, probably written on Nov. 12, 1952, AEC.

3. Atomic Shield, pp. 437-38; New York Times, Nov. 11, 1952, p. 16.

4. Dean to Eisenhower, Nov. 7, 1952, AEC.

5. In the 1950s the name was spelled "Eniwetok," but the modern version "Enewetak" is used in this book.

6. AEC Press Release 374, May 25, 1951, AEC.

7. For background, see Atomic Shield, pp. 565-68.

8. Ibid., pp. 388-91.

9. AEC Briefing Book, Nov. 1952, AEC.

10. Not all these figures were in the Briefing Book; some come from AEC Monthly Status & Progress Report, Nov. 1952, AEC.

11. Dean, opening remarks for meeting with Eisenhower, Nov. 19, 1952, attached to Nov. 19 entry in Dean Diary, AEC.

12. Dean Diary, Nov. 18, 1952, AEC.

13. The following description of the Commodore meeting is based on Murray's notes on Discussion with President-Elect Eisenhower, Nov. 19, 1952, TEM.

14. Dean Diary, Nov. 24, 1952, AEC.

CHAPTER 3
THE PRESIDENT AND THE BOMB

In his inaugural address on January 20, 1953, President Eisenhower said nothing explicit about atomic energy, but there were unmistakable overtones in his careful phrases. He asked the Nation: "Are we nearing the light -- a day of freedom and of peace for all mankind? Or are the shadows of another night closing in upon us? . . .This trial comes at a moment when man's power to achieve good or to inflict evil surpasses the brightest hopes and sharpest fears of all ages. . . .Science seems ready to confer upon us, as its final gift, the power to erase human life from this planet."[1] The recent test of Mike at Enewetak must have been on Eisenhower's mind as he read these words.

THE THERMONUCLEAR QUESTION

Eisenhower's veiled reference to the hydrogen bomb showed that he recognized the significance of Mike, but the new President could not have suspected that on the very next day he would be faced with a profound disagreement among leading nuclear scientists, a controversy that raised serious questions about the adequacy of the Commission's thermonuclear program. The day after the inauguration Representative Carl T. Durham, acting chairman of the Joint Committee on Atomic Energy, told the President that the Joint Committee staff had compiled a massive chronology purporting to document the argument that the Commission had been less than enthusiastic in its efforts to develop a hydrogen bomb. Eisenhower expressed interest and a few days later asked Durham for a copy of the study.[2]

The disagreement had its origins deep in the internals of the atomic energy establishment, in life-and-death issues which aroused passions and emotions. Like most things related to the hydrogen bomb, however, the debate over the scope and pace of the thermonuclear program was known to relatively few people, even among those who worked behind the security barrier that sealed off the world of atomic energy from the rest of American life. Old-timers in atomic energy development like Edward Teller could trace the dispute all the way back to the early 1940s. Teller was an extraordinary theoretical physicist whose creative imagination had many times proven invaluable in developing ideas for nuclear weapons. He had long been intrigued with the idea of a bomb that would draw upon the enormous amounts of thermonuclear energy that powered the stars. But Teller was also a passionate individualist driven by strong emotions and original conceptions that raced far beyond the realm of existing reality. After the announcement of the first Soviet nuclear weapon test in September 1949, Teller had been one of the leaders in the successful attempt to convince President Truman that the United States should answer the Soviet challenge by accelerating the work at the Los Alamos weapon laboratory on a hydrogen bomb.[3]

Despite aggressive efforts at Los Alamos, Teller was not convinced that either Los Alamos or the Commission was doing enough to assure the earliest possible achievement of a thermonuclear weapon. Teller's contribution had been crucial in supplying the design principle that would make the Enewetak test possible, but he continued his criticisms of Los Alamos and the Commission, even to the point of leaving Los Alamos and openly advocating early in 1952 the establishment of a new laboratory for thermonuclear research.[4]

In this new venture Teller drew upon old allies in the thermonuclear dispute, Senator Brien McMahon, chairman of the powerful Joint Committee on Atomic Energy, and William L. Borden, the committee's executive director.

McMahon and Borden, like Teller, were men of passionate beliefs who lived in daily fear of the Soviet menace. McMahon, with his energetic leadership and the assistance of Borden's keen intellect, had dominated the Joint Committee since 1949. Their constant concern was whether the Commission was moving fast enough in developing and producing weapons.

Perhaps with Teller's prodding, perhaps on their own initiative, McMahon and Borden launched two further inquiries into the adequacy of nuclear weapon development in February 1952. In the first hearing, with the Secretary of Defense and the Joint Chiefs of Staff, McMahon raised the specter that Klaus Fuchs, the German-born British scientist who had been convicted of Soviet espionage in 1950, had acquired during his stay at Los Alamos some of the essential principles of the thermonuclear weapon. Convinced that American efforts had been less than expeditious, McMahon feared that the Russians might already be ahead of the United States in the thermonuclear field. In a second hearing two weeks later Borden presented the Commissioners with an alarming interpretation of recent intelligence reports about the nature of the third Soviet test, information that suggested a dangerous underestimation of Soviet capabilities in producing both fissionable and thermonuclear materials by isotope separation.[6]

In both instances the attempts by McMahon and Borden to accelerate weapon development failed. In the first the Department of Defense found that there were no grounds for concluding that the Commission's efforts were inadequate.[7] In the second, Commissioner Smyth displayed his command of production and weapon technology by convincingly discounting the significance of the reports about the Soviet test. A few weeks later, however, in March 1952, the same stories about Fuchs and the recent Soviet test stirred up enough concern in the new Deputy Secretary of Defense, William C. Foster, to result in a meeting of the National Security Council's special committee on atomic energy. After Teller had briefed the committee on the history of weapon development, Dean with considerable difficulty convinced the Secretaries of Defense and State that there was nothing new or particularly significant in Teller's fears.[8]

Although Dean succeeded in keeping the thermonuclear question out of the National Security Council, he could not contain Teller within the atomic energy establishment. The issue of whether to create a second laboratory inevitably embroiled the Commission's general advisory committee and its chairman, J. Robert Oppenheimer. A man of exceptional ability as a physicist, administrator, and leader, Oppenheimer had built and directed the Los Alamos laboratory during World War II, had sparked much of the United States' effort to establish international control of atomic energy after the war, and, as chairman of the Commission's principal advisory committee since 1947, perhaps more than any other individual had influenced the Commission's course in its formative years. Oppenheimer also served on important committees in other executive departments. Like most of the members of the general advisory committee, Oppenheimer was not convinced that a second laboratory would necessarily enhance weapon development.[9] Indirectly Oppenheimer criticized Teller for promoting the second laboratory for political rather than technical reasons. The committee members also complained among themselves that they were being blamed for deficiencies at Los Alamos which they had tried to correct much earlier.

One of the scientists with whom the committee consulted on the second laboratory was Hans A. Bethe, the distinguished theoretical physicist from Cornell University who had long been associated with weapon development at Los Alamos. Bethe was disturbed by what he heard at the committee meeting, particularly by Dean's reports of growing dissatisfaction within the Defense Department over the thermonuclear project. He decided to write the Secretary of

the Air Force a letter setting the record straight. His summary of thermonuclear development since 1946 was designed to show that Fuchs was not exposed to vital information about design of the hydrogen bomb and that Teller's conception in April 1951 was essential to the American success.[10] Teller, when he read Bethe's summary, came to exactly the opposite conclusion.

Borden's reaction to Bethe's analysis and Teller's critique was one of frustration and alarm. In Borden's opinion the Bethe analysis was nothing but a "white wash," perhaps even the result of a conspiracy by Oppenheimer and the Commission to hide the inadequacy of the thermonuclear program.[11] There was no consolation for Borden in the fact that Oppenheimer had retired from the general advisory committee on June 30, 1952. Oppenheimer still had ample means of exerting what Borden considered a negative influence on military developments. Borden had also been disheartened by the death of McMahon a few weeks later. With McMahon's strong voice silenced, Borden felt that he alone would have to shoulder the leadership for awakening the Nation to the lagging development of nuclear weapons, especially the hydrogen bomb.

Borden decided first to set the record straight by compiling a "history" or "chronology." For this task he recruited John T. Walker, like himself a Yale law graduate, who would serve also as the Joint Committee's counsel. From the committee's voluminous files Walker compiled a compendium of excerpts from correspondence, reports, and hearing transcripts that seemed to demonstrate the failure of the Commission, the general advisory committee, Defense officials, and military officers to understand the overwhelming importance of thermonuclear weapons. The excerpts were arranged in chronological order with a minimum of editorializing; but, like a lawyer's summary of evidence, the chronology moved inexorably to its intended conclusion.

The nature of Walker's assignment made it impossible for him to turn to the Commission staff or to Los Alamos for technical assistance. Instead, he relied on John A. Wheeler, the theoretical physicist who directed Project Matterhorn as a part of the Commission's thermonuclear effort at Princeton University. Wheeler not only had expert knowledge of the subject but also as a Commission consultant was cleared for access to highly classified information. He had the further advantage of being close to Teller's views and thus generally sympathetic with Borden's purpose. In addition to reviewing the chronology, Wheeler also agreed to comment upon a reexamination of the Fuchs question which Walker had prepared as part of his study.[12]

THE WHEELER INCIDENT

By New Year's Day, 1953, the chronology was in final form, presumably incorporating Wheeler's latest suggestions,[13] but Walker was still deeply immersed in the Fuchs question. Walker, with Borden's encouragement, attempted to outline in detail how Fuchs might have picked up the germ of the thermonuclear principle as early as 1946. During the first week in January Walker mailed Wheeler his analysis of the evidence. The press of business did not give Wheeler time to read the Walker document; and Wheeler finally took it with him on a trip to Washington, when he would have an opportunity to discuss it with Walker.

Thus the stage was set for the calamity that threw the thermonuclear debate into the lap of President Eisenhower. Although Wheeler took special precautions to keep this and other highly classified documents in his possession during his overnight train ride to Washington, he inadvertently misplaced the envelope containing the documents the following morning. He was able to retrieve the envelope, but the Walker document was missing. After a frantic search Wheeler reported the loss to the Joint Committee. Borden personally called railroad and

Pullman officials to impound the sleeping car and all laundry and trash from the train. Not until sometime before noon did Borden call the FBI. An exhaustive search, including partial dismantling of the Pullman car, failed to locate the document.

The loss seemed certain to hold awesome consequences not only for Wheeler but also for Borden. In the first place, the document contained a succinct summary of the American thermonuclear program, including the design and operating principles of the Mike device, important code names, and a summary of the Bethe-Teller "debate."[14] It was hard to imagine how anyone could have selected a more sensitive document of so few pages concerning the hydrogen bomb. Second, a document of this sensitivity should have been handled as top secret material, which according to Commission security regulations was to be transported only by an armed courier in a private compartment. Third, Wheeler, while serving under a Commission contract and traveling on Commission funds, had lost the document in the process of compiling material which would reflect unfavorably on the Commission's management of the project.

Whether by design or circumstance, the loss of the Walker document did not immediately come to the attention of the Commission. Not until January 13, almost a week after the incident, did John A. Waters, the Commission's director of security, receive a routine letter from J. Edgar Hoover, director of the FBI, informing the Commission that Wheeler had lost a "confidential document. . .summarizing the Atomic Energy Program."[15]

Because Hoover's letter did not suggest the true significance of the lost document, Waters handled it as a routine matter.[16] Nine days later, when Waters learned that the FBI had not yet obtained a copy of the lost document from the Joint Committee, he became concerned and notified the Commission's general manager, Marion W. Boyer. After several discussions with Borden, Waters finally arranged to see a copy of the Walker report on February 4, but even then Borden would not permit the Commission to have a copy. Waters and a Commission classification officer who saw the document were aghast at its contents and immediately informed the Commissioners. Dean personally called the FBI to alert the agency to the extreme sensitivity of the lost information, and Commissioner Murray briefed Hoover on the serious nature of the loss. Not until that day did Borden give the Commission a copy of the Walker document.

Borden had every reason to try to avoid confrontation over the Wheeler debacle. At last realizing the full implications of the case, Hoover decided to report the loss to the White House. Eisenhower, appalled by such an incredible security lapse in the waning days of the Truman Administration, seized an opportunity before a scheduled meeting of the Commissioners with the National Security Council to demand an explanation of the incident. Lined up like five school boys before the master's desk, Smyth later recalled, the Commissioners meekly witnessed an extraordinary display of Presidential anger. Murray had never in his life seen anyone more agitated. In the Army, Eisenhower observed, a security offender was dealt with swiftly and surely. At first Eisenhower was convinced it was an "inside job," purposely designed to get the papers into Russian hands.[17] Dean attempted to explain the complexities of the case: that the lost paper was not a Commission document, that Wheeler was no ordinary physicist, and that the Joint Committee was deeply implicated in the affair.

Why was it necessary for the Joint Committee to have such sensitive materials in the first place? Eisenhower's inquiry unwittingly echoed the question some of the Commissioners had been asking themselves. Dean patiently explained that under the terms of the Atomic Energy Act the Commission was required to keep the committee "fully and currently informed."[18] Eisenhower thought this provision was a mistake and expressed doubts about the leadership

of the committee. Dean explained that since McMahon's death the preceding summer the committee had been effectively without a chairman. Durham, the ranking Democrat on the committee, had taken McMahon's place; but now that the Republicans controlled the Congress, it was not clear who would be chairman. Until Durham had taken over the chairmanship, the committee had always elected a senator as chairman, but now there was a bitter dispute within the committee over whether Senator Bourke B. Hickenlooper of Iowa or Congressman W. Sterling Cole of New York would get the post. Dean also mentioned to the President that neither he nor any of his fellow Commissioners had seen a copy of the Walker paper. He was not even certain that the Joint Committee staff had informed all of the committee members about the loss.

The President, clearly shocked by the affair and not satisfied with Dean's reply, announced that he would call Hickenlooper and Cole to his office the following morning and demand that they come to a decision at once on the question of the chairmanship. He was also going to recommend a reorganization of staff functions to prevent a similar loss in the future. Still unnerved by the incident two days later, Eisenhower discussed the problem with the National Security Council on February 18.[19] He understood that the technical staff of the committee was to be abolished when the new chairman was selected, but this action would not lessen the appalling danger created by the loss of the Walker paper. Several members of the council expressed their opinion that the incident could not be attributed to carelessness but to nothing less than treason and espionage. Vice President Richard M. Nixon suggested a complete FBI investigation of every member of the committee staff, and there was some discussion about whether Hoover and the FBI could take custody of the committee's classified files.

The strong reactions of Eisenhower and the National Security Council may have been stimulated by the growing pressure of the Rosenberg case. When Wheeler had made his ill-fated trip to Washington on the night of January 6, many Rosenberg sympathizers were coming to the Nation's capital to demonstrate at the White House for presidential clemency for Julius and Ethel Rosenberg, the convicted atomic spies whose execution had been stayed until the President could act. On February 11, just a week before Eisenhower learned of the loss of the Walker document, the President had denied clemency on the grounds that the Rosenberg's betrayal of the Nation's atomic secrets to Russia "could well result in the deaths of many, many thousands of innocent citizens."[20]

In the face of this decision, how could Eisenhower have viewed the loss of the Walker document with less concern? After all, the Rosenbergs had presumably passed on unevaluated information about the early designs of atomic weapons; the Walker paper was a detailed and authentic description of the operating principles of the hydrogen bomb. There was, however, a certain irony in the outcome of the Wheeler affair. Wheeler, who admitted his carelessness, suffered no public embarrassment. No one who really knew him or anything about the incident ever questioned his loyalty or integrity. In a most serious predicament, which might have resulted in the loss of Wheeler's security clearance, the Commission's chairman had defended Wheeler before the President as a scientist of exceptional abilities, a man so gifted that the Nation could not afford to lose his services. Wheeler received an oral and written reprimand from Dean, but the incident was completely concealed behind the security barriers.

Borden, on the other hand, stood to lose most of the influence that he had come to wield over national policy on nuclear weapons. Before McMahon's death Borden had been one of the most powerful and effective spokesmen for nuclear weapons in the atomic energy establishment, but he now realized that his days

with the Joint Committee were numbered. Even before the Republican victory in the November elections Borden had consulted Strauss and others about a position in private industry. The Wheeler incident now made the inevitable more imminent. Dean seized the opportunity afforded by Wheeler's lapse to break Borden's grip on the committee. By bringing the incident to the attention of the President and some committee members before Borden reported them, Dean undermined confidence in Borden in places that counted most. In the spring of 1953 Borden began in earnest to wind up his affairs on the Hill.

If Borden had any regret over leaving his committee post, it was that he might not have time to complete his campaign for the thermonuclear weapon. The planning and hard work of the preceding three years had culminated in the thermonuclear chronology, which he considered a massive indictment of the Commission's efforts. Walker had worked day and night to complete the study before he left the Joint Committee staff early in 1953. No doubt Borden had paved the way for Congressman Durham to raise the thermonuclear issue with Eisenhower the day after the inauguration. The new President had acknowledged receipt of the chronology on February 14, 1953,[21] but could hardly have grasped the significance of the bulky and somewhat turgid document before he heard the alarming news of the Walker paper. The irony was that Borden, who had tried with all the considerable powers at his command to speed the building of a thermonuclear arsenal, had through the Wheeler incident destroyed his own effectiveness in advancing that cause.

THE SHADOW OF THE BOMB

Since Roy Snapp's secret visit to Augusta in November 1952, Eisenhower had been struggling with the staggering implications of a weapon that could destroy not only an entire city but perhaps civilization itself. Dean and his colleagues had explained the hydrogen bomb in a technical sense, as a piece of hardware which could be produced if sufficient materials were available. They had outlined the Commission's plans for testing components of a deliverable thermonuclear weapon at the Nevada Proving Grounds during the spring and achieving an emergency capability after a full-scale test in the Pacific early in 1954. The President still had faith in the Commission's technical competence in these matters, despite the indictment set forth in the Joint Committee chronology.

From his very first exposure to the subject, however, Eisenhower saw the hydrogen bomb as much more than a matter of weapon technology. He focused immediately on the enormous power of the new weapon, the falling ratio of cost to destructive capability, and the desperate problems of control in a hostile world. However competent the atomic energy establishment might be, the Commissioners did not speak to these larger considerations; at least they had not (and perhaps could not) in the limited context of a presidential briefing. Outside the Commission there was virtually no one who had enough facts to discuss the situation at all.

A rare opportunity to wrestle with some of the larger issues presented by the hydrogen bomb came in February 1953 when the President received a report on "Armaments and American Policy" prepared by a group of State Department consultants.[22] The report had originated in a request from Secretary of State Dean G. Acheson in April 1952 that a group of consultants take a fresh look at the strategy which the United States was using in the increasingly meaningless sessions of the United Nations Disarmament Commission. Because Acheson was thinking of a wide-ranging, original study similar to that prepared by the Acheson-Lilienthal group in 1946, he appointed two members of that group to the disarmament panel: Oppenheimer and Vannevar Bush, the eminent electrical

engineer and administrator who had had a key role in formulating government policy on science and atomic energy for more than a decade. The other members of the panel were John S. Dickey and Joseph E. Johnson, both former State Department officials who were now prominent in academic circles; and Allen W. Dulles, deputy director of the Central Intelligence Agency. McGeorge Bundy, then on the Harvard faculty, served as secretary and Oppenheimer as chairman.

The Oppenheimer disarmament panel did not take a narrow view of its assignment but rather chose "to consider the problem of arms limitation in the context of a general study of the political meaning of modern weapons in the present deeply divided world." In this broader context the panel soon became convinced that the proper center of study was not arms regulation itself but the larger range of problems which came under the general heading of armaments and American policy. Reviewing the history of arms control since the time of the Acheson-Lilienthal study, the panel saw no real sign of likely agreement, largely because of the intransigent and deceitful attitude of the Soviet Union. The differences between the "free world" and the Soviet Union were "so deep-seated that no genuine, large-scale political settlement seems likely within the present generation."

The panel was convinced, however, that something had to be done about the frightening acceleration of the arms race in which devastating power was accumulating on both sides at an unprecedented rate and in a way that would put the heart of both nations, not just international borders and armies, on the front lines of any future war. Even more dangerous was the fact that few people, even inside the government, understood the special character of the nuclear arms race. Because nuclear weapons were so dangerous, men hesitated to think hard about them, and the resultant high level of security reduced "the quantity and quality of responsible discussion."

What most people, both inside and outside the government, failed to understand, the disarmament panel claimed, was not only that the nuclear stockpiles on both sides were growing at a phenomenal rate, but also that the destructive force of the weapons in the stockpiles was increasing rapidly as new models replaced old. The panel saw no real long-term shortage of fissionable material for any major power, and considered nuclear weapons relatively cheap. The Soviet Union might never have as many bombs as the United States at any given time, but the panel pointed out that the Russians easily could have as many as the Americans had had a few years earlier. In a matter of five or ten years the Soviet Union would have enough nuclear weapons to destroy American society beyond hope of recovery.

Because few Americans understood the unprecedented implication of the nuclear arms race, the panel believed that the United States government had reacted to the growing Russian threat with the knee-jerk response of trying to stay ahead of the Soviet Union in weapon development and in building the capability for a massive nuclear attack in case of war. The United States, in the panel's opinion, had backed itself into a rigid policy of massive nuclear retaliation which left the Nation no flexibility for response.

To provide for more flexibility, the disarmament panel first recommended "a policy of candor toward the American people -- and at least equally toward its own elected representatives and responsible officials -- in presenting the meaning of the arms race." Public understanding was essential to the American system, and Americans did not show a responsible awareness of the dangers of nuclear weapons. There should be a straight-forward statement from those who knew the facts, including quantities of weapons and rates of increase. The State Department advisors did not believe that the facts would cause hysteria;

the present danger in the United States was not hysteria but complacency. Americans should understand the rate and impact of the Soviet danger, and the government should go beyond the point of just keeping ahead of the Russians.

The panel's other recommendations were not spelled out in as much detail but they were firmly stated. The United States, in the consultants' opinion, should help other nations in the free world to understand the nuclear threat and their relationship to America's nuclear might so that there might be some sense of shared responsibility outside the Soviet bloc. The panel urged much more attention to continental defense of the United States, not that a Soviet nuclear attack could be entirely prevented but rather to minimize its effects and to give the United States more freedom to act in a crisis. Finally, the consultants recommended that the United States disengage itself from the hopeless and misleading disarmament discussions in the United Nations and develop better communications with the Soviet Union.

Unlike many reports by consultants, Bundy's final draft of the panel study reflected a broad understanding of the subject, careful analysis, a judicious balance of the ideal and the practical, and above all succinct and direct language. Eisenhower was so impressed with the report that he discussed it at some length with the National Security Council on February 18, 1953.[23] He was particularly taken with the first recommendation, for more candor in explaining the nature of the arms race to the American people. The President asked the council members to read the report and be prepared to discuss it the following week.

The council meeting on February 25 gave Dean as well as all the members an opportunity to express their views on the report. Dean had arranged to discuss it with Allen Dulles, one of the panel members, before going to the meeting. Dean favored the first recommendation on the grounds that better understanding of the growing power of nuclear weapons would have a salutary effect on both the Kremlin and the American people. Secretary Wilson led the opposition to the panel's recommendations, primarily on the grounds that a candid explanation of the arms race would frighten the American people rather than reassure them. Eisenhower was now concerned about the first recommendation for Operation Candor. He could see that a better understanding of the catastrophic implications of nuclear warfare both in the United States and throughout the world would be a step toward peace. At the same time, the President was deeply impressed with the importance of secrecy and particularly its value in keeping the Russians off balance.[24] Like many things in government, candor was good in theory but hard to put into practice.

THE BATTLE REJOINED

Eisenhower's favorable reaction to the panel report represented no small accomplishment for Oppenheimer and his colleagues. In the hostile and strident atmosphere of the Cold War, it was not easy to sound the note for openness and public discussion of policies affecting the national security. By catching the President's attention, Oppenheimer had reason to hope that the deadly issues surrounding the development and production of ever more efficient nuclear weapons would not be buried once again from public view. To bring the issues into public debate Oppenheimer presented an unclassified version of the panel report at a meeting of the Council on Foreign Relations in New York on February 17.[25]

Oppenheimer's very success, however, increased the likelihood that adversaries who had been trying to drive him from the government since 1949 would join forces once again to challenge him as the panel report raised old issues in a new form. Just as the President had seized on the Candor proposal as the most

intriguiging idea in the panel report, so others would use Candor as a symbol encompassing the complex of philosophical arguments that arose from the contemplation of thermonuclear war. Thus Candor served as a lightning rod that inevitably drew old rivals back to the great debate over thermonuclear strategy.

For Oppenheimer nothing was more fateful than the circumstances that made it possible for two of his most skillful and dedicated adversaries to join forces once again just as the Candor breakthrough occurred in February 1953. Although Borden was on his way out as executive director of the Joint Committee, he had the determination and fortitude to hold on for one more skirmish with Oppenheimer on national security issues. In his lonely battle as a Democratic holdover in a Republican Administration he had the immense good fortune of acquiring the support of a former ally who was to become the President's closest advisor on atomic energy. On March 7, two weeks after Oppenheimer's meeting with the President, Lewis Strauss became Eisenhower's special assistant on atomic energy.

Development of the hydrogen bomb had been the common interest that first brought Borden and Strauss together. Back in 1949 both men had felt strongly enough about the urgency of the weapon to look upon the reservations of Oppenheimer and the general advisory committee with incomprehension and dismay. The two men had worked together to redirect the trend of events which Oppenheimer's committee had set in motion, and they had emerged victorious when President Truman decided to accelerate research on the hydrogen bomb in January 1950. After Strauss left the Commission a few weeks later, Borden arranged to have Strauss serve as a special advisor to the Joint Committee on the expansion of the Commission's capacity for producing fissionable material, and the two men kept in touch after that assignment ended. In the summer of 1952 Strauss had helped Borden and Walker in providing information from his personal records for the thermonuclear chronology.[26]

Strauss and Borden were also drawn together by their growing distrust of Oppenheimer's motives, integrity, and judgment, particularly after their experience during the hydrogen bomb debate in 1949. Borden perhaps first learned that there was derogatory information in Oppenheimer's security file a few weeks after President Truman's hydrogen bomb decision, when J. Edgar Hoover testified before the Joint Committee. He had an opportunity to review the file briefly in November 1950.[27]

The FBI's file on Oppenheimer went back to March 1944, when an FBI investigation revealed that Oppenheimer had belonged to several organizations infiltrated or dominated by communists. The FBI also learned that early in the 1940s Oppenheimer's brother, wife, and former mistress had been communists. Even after he became involved in the Manhattan Project, Oppenheimer continued to associate with members of the Communist party. Strauss had known about the content of the file at least as early as March 1947, when as a Commissioner he had reviewed it and agreed that it contained no new information that warranted further consideration of Oppenheimer's clearance.[28]

Strauss' attitude toward Oppenheimer was ambivalent at best. On the one hand he was impressed by Oppenheimer's intelligence and ability as an administrator and scientist. As a trustee of the Institute for Advanced Study, Strauss had urged Oppenheimer's appointment as director. As a Commissoner, Strauss had offered Oppenheimer assistance in his work as chairman of the general advisory committee.[29] On the other hand, the two men disagreed on many issues in addition to those related to the thermonuclear weapon: on the merits of exchanging nuclear information and material with other nations, on the need for rigid security in research activities, and on the feasibility of Operation Candor. Common among Commission staff members was a story, based on one

dramatic incident, that Oppenheimer had earned Strauss' undying hatred by ridiculing him before the Joint Committee in a public hearing for his opposition to the shipment of iron isotopes to Norway in 1949. The event had occurred but it hardly seemed a sufficient explanation for Strauss' feelings about Oppenheimer. Strauss was sensitive to personal slights but he was also sophisticated enough to take into account a wide variety of factors in making any decision.[30]

Both Strauss and Borden were able in 1951 and 1952 to suspend any personal judgments about Oppenheimer's loyalty, but they continued to worry about his effect on thermonuclear development. In August 1951 they had shared exasperation over what they saw as Oppenheimer's efforts to discourage scientists from working on the hydrogen bomb. The decision led inevitably to speculation about Oppenheimer's motivations, and the two men mulled over once again some of the troubling information in Oppenheimer's security file. In the spring of 1952 Borden was among those who attempted to remove Oppenheimer's influence from the atomic energy program by making certain that he was not reappointed to the general advisory committee when his term expired on June 30. There is no evidence that Strauss was directly involved, but he was probably aware of the successful efforts by Teller, Murray, and Willard F. Libby to prevent Oppenheimer's reappointment.[31]

Oppenheimer's decision not to seek another term in the face of the opposition did not end the matter. Although no longer a member of the general advisory committee, Oppenheimer did obtain a consultant's contract from the Commission and several government boards. Hence Borden had no reason to relax his concern about Oppenheimer. Probably at Borden's suggestion, Senator McMahon invited Francis P. Cotter, a former FBI specialist in Soviet espionage techniques, to join the committee staff. Cotter's sole function was to dig into every scrap of evidence, to check out every lead in the Oppenheimer file. Both Borden and Cotter followed with interest the government's case against Joseph W. Weinberg, at one time a graduate student in physics at the University of California, for perjuring himself in testifying that he had never attended a communist meeting in Berkeley in 1941, when one such meeting was allegedly held in Oppenheimer's residence. Perhaps Borden's suspicions were further aroused when the case against Weinberg was suddenly dropped.[32]

During the summer of 1952 Cotter continued to run down snippets of information in Oppenheimer's security file. In November he completed a working paper presenting a fair and straight-forward distillation of Oppenheimer's record. Then came Walker's round-the-clock efforts to complete the thermonuclear chronology, the successful plan to bring the chronology to the attention of the new President, and the Wheeler incident, which continued to haunt Borden into the spring of 1953, as both J. Edgar Hoover and Gordon Dean faulted the Joint Committee (and by implication Borden) for lax security practices revealed by the Wheeler case.[33] In one way or another, all of the issues with which Borden had been struggling for four years seemed to be coming to a head.

SECURITY AND CANDOR

During Strauss' first six weeks at the White House he had little time for Borden, Oppenheimer, or Candor as he tried to protect the Commission's nuclear projects from the Administration's efforts to balance the budget. Because Borden was persona non grata in administration circles after the Wheeler incident, any contacts with Strauss must have been informal and discreet. The first recorded contact between the two men in 1953 occurred on April 28, when Borden called Strauss' office at the White House and arranged to bring over "a paper," which he delivered personally on the afternoon of April 30. Borden's

call may have been related to the launching of an open attack upon Oppenheimer. That same day Strauss had telephone conversations with six other men who were deeply involved in the movement.[34]

The medium of attack was to be an anonymous article in the May issue of Fortune magazine. The author, the public was to learn months later, was Charles J. V. Murphy, an editor of Fortune who had served as an Air Force reserve officer with Secretary Thomas K. Finletter. Murphy's article purported to summarize over a period of six years Oppenheimer's pernicious influence on the development of nuclear weapons, especially the hydrogen bomb. Rifled with inaccuracies and oversimplifications, the article cast a sinister connotation on many events familiar to those in the atomic energy establishment: the lack of progress on thermonuclear development at Los Alamos during the years when Oppenheimer dominated the Commission's weapon development policies through the general advisory committee; Oppenheimer's opposition to Teller's demand for a second weapon laboratory; Oppenheimer's leadership in opposing an accelerated thermonuclear program in 1949; and his subtle efforts to discourage scientists from joining the project after 1950.[35]

Murphy, however, gave much more attention to another conflict less familiar to those in atomic energy circles. This dispute involved Oppenheimer's disagreements with Air Force officials over the role of air power in nuclear war. As Murphy explained it, "a life-and-death struggle" had developed over national military policy "between a highly influential group of American scientists and the military." The "prime mover among the scientists" was Oppenheimer, who had "no confidence in the military's assumption that SAC [Strategic Air Command] as a weapon of mass destruction is a real deterrent to Soviet action." Murphy supported his thesis with a facile and oversimplified account of Oppenheimer's alleged success in subverting a series of study projects financed by the military to investigate some of the strategic and tactical implications of nuclear war. These studies included Project Charles at the Massachusetts Institute of Technology to evaluate defense systems against atomic attack, the creation of the Lincoln Air Defense Laboratory in 1951 to study air defense systems, the Vista study at the California Institute of Technology in 1951 to investigate the tactical uses of nuclear weapons, and the Lincoln Summer Study in 1952 of the feasibility of a continental air defense system against a Soviet nuclear attack.[36]

In what appeared to be an accurate description of the fears and suspicions circulating at the highest levels of the Air Force at that time, Murphy explained how Oppenheimer and other scientists close to him allegedly undermined the original intent of these studies and transformed them into clever repudiations of the Air Force doctrine of strategic bombing. By the summer of 1952, Murphy declared, Oppenheimer and his associates were united in a sinister conspiracy calling itself "ZORC" (based on the initials of the four alleged conspirators), which was determined to strip the United States of its nuclear superiority in a misguided and naive hope that such action would reduce the threat of nuclear war.[37]

Strauss was not the only man of influence in Washington to be aroused by Murphy's innuendoes. On May 12 Senator Joseph R. McCarthy called on J. Edgar Hoover to discuss the possibility of starting an investigation of Oppenheimer. McCarthy hinted at bipartisan support when he noted that Senator Stuart Symington, a Democrat and former Air Force Secretary, was concerned enough about Oppenheimer's controversy with the Air Force to consider an investigation. Hoover tried to discourage McCarthy by suggesting that such a move might involve a jurisdictional dispute with the Joint Committee on Atomic Energy or the Jenner committee. But Hoover's main concern was Oppenheimer's broad popularity,

especially among scientists. Whatever the committee decided to do about Oppenheimer, Hoover advised, "should be done with a great deal of preliminary spade work" so that, when the investigation became public knowledge, the committee "would have substantive facts upon which to predicate its action."[38] Strauss, who was in close contact with the FBI at the time, must have found the threat of a McCarthy investigation alarming. Not only would it put the Administration on the defensive on the Oppenheimer case, a position Strauss would not have relished; but it also might stir up enormous popular support for Oppenheimer without presenting a convincing case against him.

By this time Candor was beginning to enter Strauss' field of vision, perhaps for the first time, and with it came a deepening concern about Oppenheimer's influence on administration policy. Back in February, when Eisenhower had first discussed the report of the disarmament panel with Oppenheimer, Candor was a fresh idea, if somewhat naive and impractical. But since the death of Stalin in March, the President had taken a more optimistic view toward relations with the Russians and in a speech to newspaper editors on April 16 had invited the new Soviet leadership "to awaken . . . to the point of peril . . . and to help turn the tide of history." The more seriously the President and others within the Administration took it, the more worried Strauss became. The planning board of the National Security Council had appointed a special committee to meet with Vannevar Bush, a member of the disarmament panel, to draw up recommendations for implementing the panel's report. On May 8 the committee endorsed most of the ideas of the Oppenheimer report in a paper distributed as NSC 151 to members of the council, its staff, and most likely to Strauss.[39]

The committee thought that the government could acquaint the American people with the nature of the arms race without causing them "to lose heart in the present struggle or to seek a solution through preventive war." Neither could the proposal require any release of technical data on nuclear weapons or any compromise of intelligence sources. At the same time, the committee noted, the Candor proposal would require an important change in existing policies. The government would be releasing not only certain facts about the arms race but also its official analysis of those facts. And to be effective the release could not occur on just one occasion but would have to take place over a period of time. Such a plan would require some understanding by the Congress and some mechanism for deciding what information should be released and how.

The committee then proceeded to outline the kinds of information to be released, the essential principle being that the government would not continue its "negative" policy of releasing fragments of information only when pressed but rather would adopt a "positive" policy of continuous publication of information. "It would mean that the President and his principal officers would regularly take the people into their confidence in the conviction that in a democracy an informed public is the best safeguard against extreme public reactions." The committee recommended that specific information be released on the degree of defense possible and that the statement be tied to the panel's recommendations on continental defense.

One of the touchiest topics was the proposed description of the United States stockpile of nuclear weapons. Stopping far short of the panel's recommendations, the committee did not propose to release actual numbers of weapons but to speak rather of the growing destructive power of stockpiled weapons, perhaps only in terms of the number of square miles that would be devastated by such a weapon. The American people would be told that the feasibility of thermonuclear weapons had been demonstrated, but it was not yet clear how thermonuclear weapons would alter the nature of atomic warfare in view

of the already enormous destructive capability of fission weapons. As for Soviet capabilities, the Nation would learn that within two years the Soviet Union would have "a stockpile numbered in the hundreds, and not many years thereafter in excess of a thousand."

OPPENHEIMER AND CANDOR

Now that Candor was becoming the centerpiece in the Administration's plans for responding to the dangers of thermonuclear war, Strauss did not dare to attack the proposal directly, although his every instinct must have rebelled at any significant release of weapon information that might help the Soviet Union. One recourse was to point to the disadvantages of Candor in his discussions with the White House staff. Another was to undermine Oppenheimer's influence and by raising questions about the scientist's security record, perhaps remove him from the Administration's policy councils altogether. The latter course suggested that Strauss and Borden might cooperate in seeking an answer to the old question of Oppenheimer's reliability.

By the middle of May 1953 Borden was devoting most of his time at the Joint Committee to the Oppenheimer case and continuing salvos against the Commission in the Wheeler security controversy. Perhaps at Strauss' instigation, the FBI asked the Commission's security office to forward any information which it received about Oppenheimer's plans for foreign travel, a move suggesting that Oppenheimer's activities abroad might somehow risk a compromise of classified information. One week later Borden called Waters at the Commission's security office to ask whether there was "anything new" in the Oppenheimer case. Before ending the call Borden asked Waters to send him Oppenheimer's security file.[40]

With Cotter's working paper on Oppenheimer already in hand, Borden did not need Oppenheimer's file for a quick review of the facts, but rather for a thoughtful study of every shred of evidence, every implication and nuance that might shed some light on the Oppenheimer mystery. Except for a brief interruption on May 19 and 20 for another acrimonious exchange of correspondence with the Commission on the Wheeler incident, Borden buried himself in the Oppenheimer case. After wrestling in his mind one more time with each scrap of evidence, he compiled fifteen pages of questions ranging from serious to frivolous. His questions, legitimate, improper, and silly, terminated with the implication that Oppenheimer had been unjustly shielded from the requisites of a thorough security review.[41]

Gradually Borden began to see the Oppenheimer case in the same light in which he viewed the whole hydrogen bomb development. That is, just as he believed that the thermonuclear program had been neglected through lack of attention, so he thought that the Oppenheimer case had been ignored by being "kicked under the rug." The more he thought about them, the more Borden analyzed the two questions in the same vein. There was, he concluded, the same kind of attitude, almost the same kind of conspiracy, working with respect to the H-bomb issue and Oppenheimer. What the Oppenheimer question needed, Borden thought, was a single document, like the thermonuclear chronology, that pulled together all the disparate facts to show the Commission's reluctance to face the Oppenheimer question squarely.

Strauss in the meantime was becoming more and more preoccupied with Oppenheimer and Candor. On May 25 he confided to an FBI official his suspicion that Oppenheimer's communist sympathies were not yet dead. A Commission report, which Strauss had requested, revealed that David Hawkins, a physicist and former member of the Communist party, had been hired to work at Los Alamos during the war at Oppenheimer's instigation and had remained there until July 1947. Strauss also described in detail his opposition to Oppenheimer's attempt to

bring Felix Browder, the son of the leader of the American Communist party, to the Institute for Advanced Study on a fellowship. Strauss' anxieties had been aroused because Browder was reportedly not an outstanding scholar and because Oppenheimer, in Strauss' estimation,[42] had employed questionable tactics in trying to push through the appointment.

Just the week before, Strauss had discovered that Oppenheimer had called the White House to request a meeting with Eisenhower on an urgent matter which he would reveal to no one but the President.[43] Privately, Strauss could only guess that the request had something to do with the forthcoming meeting of the National Security Council to discuss the Administration's plans for Candor, or was it possible that Oppenheimer had caught wind of the renewed interest in his security file and was trying to protect himself? Strauss asked the FBI whether it would cause any difficulty if he should mention his concerns about Oppenheimer to the President when Strauss saw him that afternoon. The FBI had no objection.

Strauss' misgivings about Oppenheimer were also heightened by a report from the Commission that Oppenheimer had written a letter to the New York security office outlining his plans to visit Brazil in June and Japan in September.[44] Could these trips conceivably be designed to provide Oppenheimer a chance to talk freely with scientists abroad or possibly even with communist agents? Strauss requested a copy of the letter immediately.

Strauss could take some satisfaction in the fact that he had been alert enough to prevent Oppenheimer from catching the President unaware either at his private session with Eisenhower, now scheduled for May 29, or at the council meeting on Candor on May 27. But the results of that meeting were hardly comforting to Strauss, who saw Candor as foolishness at its best and a threat to national security at its worst. Much of the discussion at the council meeting reiterated the positions taken on February 25: the President's infatuation with the Candor idea despite its incompatibility with his strong instinct for secrecy and the opinions of Secretaries Wilson and Humphrey that Candor would scare the American people. In the end the argument seemed to move the President in the direction of Candor, but he still had reservations. These led him to the idea, and then to a decision, that all government statements in the future should avoid any reference to thermonuclear weapons and should use only the generic term "atomic weapons." Before making a final decision, Eisenhower wanted to see a draft of a speech that he might use to launch the project.[45]

Oppenheimer's new success in promoting Candor with the President must have heightened Strauss' anxiety about the scientist's influence over national security policy. If Oppenheimer was a security risk--a possibility Strauss had been unable to reject--his support of Candor could be interpreted as an attempt to compromise atomic secrets. The gnawing doubts which Oppenheimer's security file had raised in the minds of Strauss and Borden now were more pertinent than ever before.

For information on security matters Strauss had well established lines of communication with both the Commission and the FBI. Not only could he telephone Dean and J. Edgar Hoover directly, but he also had informal contacts at the working level in both agencies through Bryan LaPlante and Charles Bates, who was Hoover's liaison agent with the Commission. During the next year Bates would be an inconspicious but almost daily visitor to the Commission's headquarters building.

On June 4 Strauss called the FBI and asked once again to see the Bureau's summary of the Oppenheimer file. When Bates arrived at Strauss' White House office a few hours later with the summary, Strauss told him that Eisenhower had drafted him against his wishes to serve as chairman of the Commission. Strauss

had warned the President that "he could not do the job" if Oppenheimer was connected in any way with the program. Strauss had spoken very frankly to the President about Oppenheimer and intended to do the same with Robert Cutler, who handled national security affairs for the President. Approaching Cutler would be tricky, Strauss said, because Cutler served with Oppenheimer on the Harvard Board of Overseers and "did not like to hear criticism of his 'friends.'"[46]

Strauss would have been even more concerned had he known about a new development in the Oppenheimer affair. During Oppenheimer's visit to Washington the previous week, the scientist had asked Dean to extend his consultantship with the Commission for another year beyond its expiration date of June 30. Time was short. Oppenheimer would be leaving for Brazil within two weeks and by the time he returned Dean would no longer be chairman. It was also quite likely that Dean and Oppenheimer knew that Strauss would by then be in charge of the Commission, a situation that would end all chances for Oppenheimer's reappointment. In light of the strong opposition to Oppenheimer revealed by Murphy's article, continuation of his Commission consultantship was the only way of retaining Oppenheimer's voice in the government in national security affairs, and specifically Candor. Without taking time to discuss the issue with the Commission or the staff, Dean instructed the general manager's office to renew Oppenheimer's contract. The renewal was dated June 5. This was perhaps the most fateful day in Robert Oppenheimer's life. As Strauss wrote nine years later: "It was this contract which involved the AEC in the clearance of Dr. Oppenheimer and which required that the Commission, rather than some other agency of the Government, was made responsible to hear and resolve the charges against him."[47]

By the first week in June the future looked promising for Candor. Oppenheimer's renewed contract assured that Candor would continue to be well represented in national policy councils. There was also every assurance that the President's speech launching Candor would be drafted quickly and efficiently. The task had been assigned to Charles D. Jackson, the ebullient editor of Time magazine who had joined the Eisenhower campaign as a speech writer in 1952. Far more imaginative and adventuresome than his boss, Jackson was constantly bombarding the President with all sorts of ideas for selling the Administration's policies to the American public. Operation Candor had struck a resonant chord in Jackson and he took up the cause with enthusiasm. He even went so far as to sound out his friends in the advertising business in New York on how the job might be done. As Jackson often discovered, however, he quickly moved far beyond the President's wildest expectations. Eisenhower refused Jackson's suggestion that he use the dedication of the nuclear submarine prototype in Idaho as an occasion for announcing Candor. The President was no more receptive to a State Department draft of a Candor kick-off speech which Jackson submitted about the middle of June.[48]

While Jackson was trying to bring the President's thoughts on Candor into focus, the idea of informing the American people about the arms race was gaining public currency. For one thing the informed public knew that the study by the State Department panel existed although the full contents of the report had not been released.[49] Oppenheimer, however, who was known to be chairman of the panel, removed some of the ambiguity in June, when Foreign Affairs published an article based on his February speech before the Council on Foreign Relations.[50] Oppenheimer had been careful to separate his personal views from any of the government's policy discussions and he had cleared a draft of the article with the White House. But anyone who knew anything about the situation could see that Oppenheimer was not writing in a vacuum. In describing the arms race,

Oppenheimer complained that "I must tell about it without communicating anything. I must reveal its nature without revealing anything."

Oppenheimer did relate information which had already been released about the Soviet program, namely that the Russians had accomplished three nuclear explosions and were producing fissionable material in substantial quantities. He also stated his own personal guess that the Russians were about four years behind the United States and that their scale of operations was not as big as that of the United States four years earlier. The American people, however, should know "quantita- tively and, above all, authoritatively where we stand in these matters." Oppenheimer confessed that he had never discussed the classified facts about the nuclear arms race with any responsible group "that did not come away with a great sense of anxiety and somberness at what they saw." The United States' four-year lead over the Russians would mean little as the nuclear stockpile grew. America's twenty-thousandth bomb would be of small comfort when the Russians had their two-thousandth. Then he added the sentence that would long outlive him: "We may be likened to two scorpions in a bottle, each capable of killing the other, but only at the risk of his own life."

One obvious frustration Oppenheimer encountered in writing his article was that he could say nothing at all about thermonuclear weapons, which lay at the center of the panel's original concern and undoubtedly sparked Eisenhower's interest in the panel report. The frustration was the same for Eisenhower, Dean, or anyone else in the government who was privy to the facts. On the one hand, there was a natural tendency to hold information about the thermonuclear test as closely as possible; on the other, the results were so obviously significant to national security that others had to know.

Dean had sensed this feeling late in May 1953, when he saw for the first time a special film prepared by Joint Task Force 132 on the Enewetak test in November 1952. The film explained in detail the physical principles involved, the working components of the Mike device, and the elaborate preparations that were taken to gather technical data about the detonation. Although the film contained enough Hollywood clichés to annoy many viewers, it did effectively build suspense for more than an hour as the spine-tingling moment of detonation approached. The climax came in the extraordinary technicolor shots of the detonation, supported by statistical data that helped to put the incredible scale of the explosion in perspective.[51]

Dean was so impressed that he immediately called Robert Cutler at the White House to urge that the President see the film. On June 1, the President, the Cabinet, the National Security Council, the Joint Chiefs of Staff, and the Commissioners assembled in the East Wing theater to view the uncut, top secret version. The following day Dean and the President discussed how some of the more sensitive technical information in the film could be deleted so that a shorter version, still classified secret, could be shown to a larger audience.[52] Within the Administration the film probably did far more than Oppenheimer's article to stimulate interest in Operation Candor.

Dean took up the Candor theme in the closing moments of his valedictory press conference as chairman of the Commission on June 25, 1953. Always the practical man, Dean cited the need to amend the Atomic Energy Act to give the Commission more flexibility in dealing with other nations and the need to release more technical information to industry. But most important of all in Dean's estimation was the release of information about atomic weapons in order to develop an informed public opinion, "which is the only realistic base upon which our defense and foreign policies can be built in the atomic age." Both Oppenheimer's and Dean's statements received wide attention in the American press. As the Christian Science Monitor noted, "A strong current has begun to

flow in the direction of less secrecy and more information for the American people about the atom."[53]

STRAUSS AND CANDOR

The current of public opinion running in favor of Candor continued to pick up speed during the first week of July 1953. In response to a question about the Oppenheimer article and the Dean valedictory, the President admitted at a press conference on July 8 that "personally I think the time has arrived when the American people must have more information on this subject, if they are to act intelligently. . . . I think the time has come to be far more, let us say, frank with the American people than we have been in the past." As the new chairman of the Commission and as a member of Eisenhower's inner circle of advisors on national security, Strauss could not entertain for a moment the idea of contradicting the President, but he was not ready to give up the fight. He would not, as the Washington Post hoped in an editorial on his appointment, move with the Candor current.[54]

Even within the Commission Strauss had to be careful not to oppose Candor openly, but he did do so indirectly. His first opportunity came when he received a comprehensive analysis of the Commission's policy on security and classification, which Smyth had prepared in the closing weeks of the Dean Administration. Smyth had concluded that it would be in the national interest to permit a greater exchange of technical information with Belgium, Canada, and the United Kingdom and to release much more data on reactor technology to American industry. In some areas, like thermonuclear weapons, a continuation of the most severe security restrictions was in order, but Smyth accepted the general thesis of the Oppenheimer panel that the public should know more about the nature of the arms race.[55]

Strauss had also received a letter from the Joint Committee on Atomic Energy citing the favorable comments by the President and Dean on Candor and requesting a detailed study of the need to revise the Atomic Energy Act to permit a wider dissemination of technical information. Without expressing his views on these specific questions, Strauss suggested that both the Smyth paper and the Joint Committee letter involved the same general issues, which he proposed to discuss in September, when he planned to take his fellow Commissioners on a week- end retreat at White Sulphur Springs, West Virginia.[56]

Some hint of Strauss' current views on security appeared in his correspondence with Senator Alexander Wiley, chairman of the Senate Foreign Relation Committee. Wiley wrote Strauss of his deep concern about American vulnerability to a Soviet nuclear attack. Until the American people were acquainted with the given facts of the nuclear arms race, they would be living in a "Fool's Paradise." In his reply Strauss did not mention Candor, but he was quick to stress the need for balancing the value of such information to the American people on the one hand and the value of the same information to potential enemies. "All of us pray," he wrote Wiley, "that history will vindicate the wisdom of our judgments, both as to what is revealed and what is continued secure."[57]

The Commission's staff had numerous occasions during Strauss' first month as chairman to observe his sensitivity to all matters dealing with security and the control of information. On July 14 he questioned an earlier Commission decision authorizing the transmittal of unclassified drawings of a Brookhaven accelerator to a group of high-energy physicists in Europe. Strauss and Murray were both fearful that the drawings, although unclassified, would help other nations build accelerators that would produce fissionable material. When Smyth assured him that this was not likely, Strauss still did not believe that the

Commission would receive any direct benefit from the release and chose to delay a decision until he could discuss the problem with Ernest Lawrence. The clear implication was that the Commission was unlikely to benefit from research performed by other countries with American materials or technical data. Reaching back to the period of his earlier service on the Commission, Strauss requested information on whether a technical report had been received from Norway on research conducted with a radioactive iron isotope which the Commission had released over Strauss' objection in 1949. Strauss also opposed release of an unclassified report on the Commission's reactor development program to the Joint Committee and expressed grave concern over the number of emergency clearances being granted and the number of missing top secret documents.[58] For oldtimers on the staff Strauss' readiness to pounce on security matters reminded them of earlier days.

Strauss was careful to make no public statements about Candor; but he worked behind the scenes to counter the Oppenheimer and Dean statements and, even, in a subtle way, the remarks by the President himself. After April 28, when he apparently first discussed with Charles Murphy the article exposing the alleged Oppenheimer conspiracy, Strauss was in frequent contact with Murphy and most probably helped him to prepare a second article, which appeared in the August 1953 issue of Fortune. More temperate and accurate than the first article, the second attempted to refute Oppenheimer's main arguments in Foreign Affairs without mentioning the insinuations of conspiracy in the May article. By reporting the President's remarks in the opening paragraphs without comment, Murphy gave his readers an opportunity to apply his criticisms of Oppenheimer's position indirectly to the President. The Murphy article contained arguments typically used by Strauss to support rigid security for weapon information and particularly for stockpile figures. Also like Strauss, Murphy placed information about nuclear power plants in a separate category as potentially suitable for release to the public. On July 16, the day Murphy sent his manuscript to the printer, he called Strauss' office for some last-minute advice. Almost as a credit, the article included one photograph, a portrait of Strauss with the caption: "Strauss believes in keeping a tight lid on information about U.S. atomic weapons."[59]

Although Murphy and Strauss had been too circumspect in the Fortune article to be accused of challenging the President, the article left no doubt about Strauss' position in the minds of administration leaders. C. D. Jackson brought up the subject over cocktails with Strauss on August 4. Strauss reassured Jackson that he was not involved in a feud with Oppenheimer, that he was not opposed to the President's speaking to the nation on Candor, but that he did object to the use of "any comparative arithmetic" on American and Soviet nuclear stockpiles.[60]

JOE 4

Any relaxation of security that Operation Candor might have inspired was suddenly blocked by new developments in the international arms race during August 1953. On August 8, in a speech before the Supreme Soviet in Moscow, Premier Georgi M. Malenkov announced that the United States no longer had a monopoly of the hydrogen bomb. In response to press inquiries Strauss blandly replied that the United States had never assumed that the bomb was beyond Soviet capabilities and for that reason had embarked on its own project three years earlier.[61]

On August 12 Strauss and the Administration received from the Air Force long-range detection system the first fragmentary evidence that Malenkov's statement was not a hollow claim. The Soviet Union had apparently conducted its

fourth nuclear weapon test, which the Americans called Joe 4. Because the detonation had been quite powerful, the Americans thought it was possibly a thermonuclear device, but direct evidence would not be available until airborne samples of radioactive debris from the test could be collected and analyzed. In the meantime it was extremely important for intelligence reasons to prevent the information from becoming public; the longer that event could be postponed, the more easily could the government conceal the degree of efficiency and accuracy of the long-range detection system. Perhaps for this reason, Strauss did not immediately inform his fellow Commissioners but chose rather, as special assistant to the President, to work with the White House staff in drafting announcements which might be used under a variety of circumstances.[62]

Strauss and Jackson met with the President in New York on the morning of August 19 to discuss both Candor and the Soviet test. Eisenhower was reluctant to make any announcement but finally approved for later release a simple statement to the effect that the Russians had conducted an atomic test. Later the same day back in Washington, after conferring with the other Commissioners and State Department and CIA officials, Strauss decided not to release any announcement until information from the first samples arrived later in the evening. In Strauss' office at the Commission headquarters at eight o'clock, scientists from the Air Force long-range detection system stated conclusively that "a fission and thermonuclear reaction had taken place within Soviet territory." Despite State Department assurances that the Russians were not likely to elaborate on Malenkov's statement of August 8, Strauss learned at ten-thirty that evening that Moscow radio had announced a Soviet test involving a hydrogen reaction several days earlier. After redrafting the public announcement to contain a reference to thermonuclear reactions, Strauss decided that he would have to clear the release with the President in view of Eisenhower's order not to mention the hydrogen bomb in public statements. Because the President was at that time flying to Denver, Strauss was unable to clear the release until almost midnight. The next day some of the nation's newspapers carried the headline: "REDS TEST H-BOMB."[63]

For most Americans, perhaps even for Strauss and others in the Administration, that simple statement was a sufficient description of Soviet capabilities. The hydrogen bomb was more than a weapon; it was a symbol of military capability that gave Oppenheimer's analogy of "two scorpions in a bottle" a new and more terrible significance. As Congressman Cole of the Joint Committee pointed out to the American Legion in October 1953 the Russians had detonated a hydrogen weapon "only nine months after our own hydrogen test." Although Strauss, like all other members of the Administration, was enjoined by the President from public comment on hydrogen bombs, Strauss did confide to others in classified discussions his fears that the Soviet Union had bypassed some of the earlier refinements of fission weapons and had concentrated on thermonuclear designs several years earlier, probably before the United States accelerated its own thermonuclear program in 1950. The President himself in a press conference on September 30, 1953, had referred to the Soviet achievement as the creation of a hydrogen bomb.[64]

The fact was, however, that neither the Commission nor the Administration had any incontrovertible evidence on August 20 or even on October 12 that the Soviet Union had developed a thermonuclear weapon. As the Commission's original statement carefully put it, the initial evidence on August 20 merely confirmed that the detonation involved both fissionable and thermonuclear materials.

It was apparent that the general statements made in 1953 and later years about Soviet superiority in thermonuclear weapon development were far from the whole truth. The Soviet scientists had not detonated a "true" hydrogen weapon

within nine months after Mike. They had not developed an airborne thermonuclear weapon before the United States. It was not true that the Americans had taken the wrong path in using deuterium while the Russians had struck out directly for the more practical lithium-deuteride approach.

Why then did these misconceptions arise and then persist in discussions of national security issues? In the first place, the inherent limitations of intelligence-gathering systems made it impossible in 1953, or even many years later, for American scientists to construct an authoritative description of all features in Joe 4. The Nation's most experienced and talented scientists could and did disagree in interpreting some of the evidence. But a second and much more important source of confusion was the extreme secrecy that surrounded both the American thermonuclear program and intelligence reports on Soviet developments. Some of the Commissioners apparently were not apprised even of the simple facts deduced by the scientists.[65] Although some of the facts did leak into the public press, distortions inevitably occurred as reporters speculated on the fragmentary evidence and the Commission for security reasons refrained from confirming or denying the accuracy of such speculations. For more than two decades the most elementary facts about Mike and Joe 4 were unconfirmed, and a full description of these devices would probably not be revealed for several more decades. Lacking a full understanding of the qualitative differences between the Soviet and American devices, Strauss and others in the Administration had no compunctions in assuming the worst about the Soviet thermonuclear challenge.

THE QUEST FOR CANDOR

During the summer of 1953, Jackson by his own admission had had little success in coming up with an acceptable draft of the Candor speech for the President. No matter what approach he took to the meaning of the thermonuclear weapon, Jackson found that he ended up with a gruesome story of human destruction. Unless the Administration could find some positive hope to present to the American people and the world, the horrifying consequences of nuclear warfare would simply generate fear, and, as the President remarked, the public could not be expected to come to an intelligent understanding in an atmosphere of fear.[66]

Joe 4 seemed to heighten the tension which the threat of thermonuclear weapons had already created both in the government and the Nation. On one side, Joe 4 represented a massive increase in the Soviet Union's nuclear capability, a trend that seemed to make the arguments for Candor even more urgent. There now seemed to be that much less information about American weapons to conceal from the Russians, and it was all the more imperative to acquaint the American people with the truth of their predicament, however unpleasant that knowledge might be. On the other side, it was possible to argue, as some did, that Joe 4 required a tightening of belts, a new dedication to enlarging the United States' own nuclear capabilities, and a need to protect every technical secret which still remained in American hands.

Eisenhower apparently felt these same kinds of tensions himself. Although he was among the most conservative of his administration in wanting to seal off the details of weapon technology from the nation's potential enemies, the President refused to abandon his initial conviction that the world needed to understand the awesome dangers of the thermonuclear age if unspeakable disaster was to be avoided. Thus, despite his dissatisfaction with Jackson's drafts, Eisenhower continued to push for Candor. By early September, Jackson, with help from his friends in the National Advertising Council, had proposed an elaborate scheme for a series of seven television programs beginning in October. The

President himself would lead off with his own statement on "The Safety of the Republic in the Atomic Age." On successive Sundays cabinet officers and other administration officials would participate in round-table discussions similar to that which Eisenhower and some of his cabinet had presented on June 3, 1953. These discussions would cover international affairs, the capabilities of the Soviet bloc, the need for strengthening the free world, the dangers of subversion at home, and the role of civilians in an age of peril.[67]

From the outset Jackson's television series seemed doomed to failure. Some government officials, J. Edgar Hoover for example, were reluctant to participate. Of equal concern to Jackson were some of those who were anxious to speak their minds. Jackson had been careful to exclude Defense Secretary Wilson, who had already demonstrated his vulnerability to baited questions in press conferences. Even with careful selection of participants and preparation of a script, it would be difficult to predict the impact of the programs in the still relatively unfamiliar medium of television. Given the exceptional sensitivity of the subject, it was frightening to contemplate the damage potential of a casual remark in a series of relatively unstructured discussions.[68]

In the end two developments during September 1953 killed the television series. One was that the idea itself inevitably leaked to the press with disastrous consequences. Now, no matter what the President decided, some of the press would probably accuse him of being less than candid about Candor. The second development was a Babel of conflicting statements, as columnist Arthur Krock put it, about the imminence of the Soviet thermonuclear threat. Strauss himself, in a speech before the National Security Industrial Association on September 30, voiced for the first time publicly his fears that the Soviet Union had bypassed research on fission weapons to beat the United States to the punch in developing the hydrogen bomb. Arthur S. Flemming, director of the Office of Defense Mobilization and an advocate of industrial dispersion, had stated in a public report on October 4 that "Soviet Russia is capable of delivering the most destructive weapon ever devised by man on chosen targets in the United States." Congressman Cole, remarking that he preferred "financial ruination" to "atomic devastation," urged the expenditure of $10 billion for air defense. Val Peterson, whose Civil Defense Administration budget had been severely cut by the Eisenhower Administration, saw no hope for a peaceful settlement of the Cold War. Secretary Wilson, on the other hand, thought the Soviet Union was three or four years behind the United States in developing both thermonuclear weapons and the aircraft to carry them.[69]

These and other contradictory statements on the threat posed by Joe 4 had reached epidemic proportions in the nation's press by the second week in October. After a long discussion of the problem at the National Security Council meeting on October 7, 1953, Eisenhower decided to accept Strauss' proposal that all statements about thermonuclear weapons by administration officials first be cleared with the chairman of the Atomic Energy Commission.[70]

The next day at his weekly press conference, Eisenhower read a carefully prepared statement on Joe 4. The Soviet Union had tested "an atomic device in which some part of the explosive force was derived from a thermonuclear reaction." The Soviet Union now had "the capability of atomic attack on us, and such capability will increase with the passage of time." The President did not "intend to disclose the details of our strength in atomic weapons of any sort, but it is large and increasing steadily." The statement, repeating words used by Strauss in his September 30 speech and by Senator Hickenlooper, a conservative Republican member of the Joint Committee, seemed to kill a central proposal by the Oppenheimer panel for Project Candor. That statement, plus the

President's assignment of Strauss as the Administration's watchdog over thermonuclear information, led the press to conclude that Candor was now dead.[71]

The President, strangely enough, did not seem to share that view. He had never considered detailed revelations about thermonuclear capabilities or the weapon stockpile an essential element of Candor. He believed that the people of the United States and of the world could be given the facts they needed about the dangers of nuclear warfare without revealing such details. What Eisenhower wanted was some positive suggestion that would give hope for the future. He was intrigued with developing an idea that had occurred to him during his vacation in Denver during August. When he had returned to Washington briefly for Chief Justice Fred M. Vinson's funeral on September 10, he had asked General Robert Cutler, who handled national security affairs, to convey his idea to Strauss and Jackson. "Suppose," the President suggested, "the United States and the Soviets were each to turn over to the United Nations, for peaceful uses, X Kilograms of fissionable material. . . ."[72]

STRAUSS AND OPPENHEIMER

Strauss may well have taken some comfort in the President's suggestion as a move away from what he saw as Oppenheimer's dangerous and naive proposal for Candor. But were Oppenheimer and his friends merely naive, or were there sinister motives behind their continuing efforts to promote Candor even in the face of the terse Soviet announcement of Joe 4? How could an intelligent person like Oppenheimer support such a hairbrained idea when the Soviet Union was obviously out to overtake the United States in nuclear weapon development? The gnawing doubts about Oppenheimer's loyalty which Strauss had shared with Borden since 1950 continued to haunt both men.

Borden seemed to drop out of Strauss' world after leaving the Joint Committee at the end of May 1953. Except for one telephone conversation on July 16, there is no evidence that the two men were again in touch during the remainder of that year. Borden, unable to fathom the Oppenheimer mystery posed in the scores of questions that he had assembled on the subject, left Washington for his vacation retreat near the St. Lawrence River. There he would continue to ponder the shadowy record of Oppenheimer's past and the scientist's impact on the development of nuclear weapons.[73]

Strauss had no such opportunity to retreat from the Oppenheimer enigma. As chairman of the Commission, he was now directly responsible for protecting what he saw as the little that was left of the Nation's
supremacy in nuclear weapon technology, and he now knew to his dismay that his future as a government official was closely linked to Oppenheimer's. Dean's action in extending Oppenheimer's consultant contract had seen to that, and for Strauss there was no easy escape. He and J. Edgar Hoover had agreed that it would be dangerous to attack Oppenheimer directly unless there was convincing evidence against him.[74] Strauss was not eager to risk his cordial relations with America's scientific giants, something he greatly cherished, and his leadership of the Commission in a dramatic showdown with a scientist as popular and prestigious as Oppenheimer. Patience and the expiration of Oppenheimer's contract on June 30, 1954, might take care of the Oppenheimer problem. But in the meantime Strauss could not afford to overlook any scrap of evidence that might convince the public that Oppenheimer could not be trusted. If such information should fall into his hands, Strauss would have no choice but to risk his political future to protect the national security.

During the summer of 1953, Strauss pursued his discreet inquiries of Oppenheimer's activities with the help of Bryan LaPlante, now his security aide, and Charles Bates of the FBI. Strauss continued to be concerned about

Oppenheimer's plans for foreign travel, presumably because trips abroad would offer him a chance to contact communist agents or even to slip behind the Iron Curtain. When the first intelligence reports on Joe 4 arrived, Strauss' level of anxiety rose. On August 18, the day before the Soviets announced Joe 4, Strauss asked for Oppenheimer's security file, which had remained at the Joint Committee since Borden requested it on May 14. The next day, before meeting with the President to discuss Joe 4 and Candor, Strauss complained privately to his fellow Commissioners about Oppenheimer's request for classified Defense documents. The Commission could refuse Oppenheimer only with difficulty since Dean had extended Oppenheimer's consultant contract in June. Strauss was further annoyed to learn on August 31 that Oppenheimer had been seeking information from the Commission staff about the recent Soviet test series, apparently in disregard of Strauss' instructions that all such information would be disseminated only through his office. In an attempt to head off Oppenheimer, Strauss told the staff that he would speak to Oppenheimer personally on September 2.[75]

Unknown to his fellow Commissioners, Strauss had already been in direct contact with Oppenheimer, who had called Strauss at his Virginia farm on August 28 for an appointment in Washington on September 1. When Strauss had suggested an afternoon meeting on that day, Oppenheimer had begged off, saying that he had an important appointment at the White House. Anxious to know what Oppenheimer was up to, Strauss asked LaPlante to arrange to have Oppenheimer put under FBI surveillance during his visit to Washington. The Bureau dutifully reported back on September 2 that Oppenheimer had not gone to the White House but had spent the entire afternoon in the men's bar of the Statler Hotel with columnist Marquis Childs. The surveillance also revealed that Joseph Volpe, Jr., a former general counsel of the Commission and Oppenheimer's lawyer in the Weinberg case, had visited Oppenheimer at the hotel for a half hour that evening. Volpe had then been trailed to a food store, where he purchased groceries and took them to the home of a former Commission employee who had worked as a special assistant to Chairman Lilienthal. Strauss guessed that Oppenheimer was giving Childs information for articles in the Washington Post supporting Oppenheimer's views on national security. The information that Volpe had visited the former Commission associate, a woman who the FBI said had a record of some association with communist-front organizations, conjured up images of illicit and possibly treasonable relationships reminiscent of those in which Oppenheimer had been involved in the 1930s. Oppenheimer's obvious lie to Strauss about his commitments for September 1 reinforced Strauss' conviction that Oppenheimer and his friends fell short of acceptable standards of morality and to that extent were less than fully trustworthy.[76]

NICHOLS AND OPPENHEIMER

After his morning conference with Oppenheimer on September 2, Strauss looked forward to a more pleasant meeting. He had invited Commissioners Murray and Zuckert to lunch with Major General Kenneth D. Nichols, Strauss' candidate to replace Marion W. Boyer as general manager. Nichols, a West Point graduate and a career Army officer with a Ph.D. in engineering, had served with General Groves in the Manhattan project. Following World War II Nichols had been a consultant to the Joint Committee. Nichols already had a reputation for being tough, principled, and opinionated. Rejected outright for any position on the Commission staff in 1947 because of his strong ties to the Manhattan project, Nichols had continually challenged the Commission's authority in military matters. In common with Oppenheimer, Nichols had raised the ire of the Air Force by advocating greater emphasis on tactical weapons. But in contrast with

the Princeton physicist, Nichols was also counted among the staunchest proponents of the hydrogen bomb.[77]

The luncheon began with some reminiscences about the Manhattan project, and then turned to Oppenheimer's position on the hydrogen bomb and the renewal of his clearance in June. Murray seized the opportunity to explain how the contract with Oppenheimer had been executed. According to Murray, Dean had not consulted the other Commissioners before renewing the contract. Murray's inference was clear: once again in the interest of expediency unwarranted shortcuts had been taken to maintain Oppenheimer's clearance.[78]

The luncheon meeting cleared the way for Nichols to assume the office of general manager on November 1, 1953, with a clear mandate to carry out the atomic energy policies of the Republican Administration as interpreted by Strauss. For over a decade Nichols' position on the Oppenheimer case, although complex, had remained consistent. Intimately familiar with Oppenheimer's record, Nichols never shared Strauss' and Borden's fears that Oppenheimer might be a Soviet agent. Nichols nevertheless maintained that Oppenheimer was a major security risk and should not be granted clearance. Nichols had opposed granting Oppenheimer's clearance in 1942. When the war ended and the need for taking chances was past, Nichols attempted to instigate a review of all questionable clearances, including Oppenheimer's. Whenever possible Nichols encouraged officials, particularly in the Department of Defense, to discontinue consultation with Oppenheimer. Nichols was more or less satisfied with the progress made in gradually terminating Oppenheimer's various clearances. Now, as general manager, Nichols was in a position to complete the process.[79]

TOWARD THE PEACEFUL ATOM

During September and October 1953 the Oppenheimer case was a matter of chronic but not paramount concern for Strauss. Much higher on his agenda was the President's suggestion that the United States and the Soviet Union might divert equal amounts of fissionable material to peaceful purposes. Strauss did not at first see any practical advantage in Eisenhower's suggestion. What good would it do to contribute fissionable materials to peaceful uses if the United States and the Soviet Union both retained large amounts in the form of weapons? And how would it be possible to protect the contributed material from falling into the hands of an aggressor nation? Not willing to take his fellow Commissioners into his confidence on so sensitive a matter, Strauss confined his discussion of the subject to breakfast meetings with Jackson at the Metropolitan Club in Washington. From these sessions the new effort took the name of Project Wheaties.[80]

By the middle of September Strauss began to think better of the idea and suggested that it be considered by an ad hoc committee on disarmament within the National Security Council. With the President's approval Strauss set out to put his ideas on paper. Starting with the assumption that any agreement with the Soviet Union "would be presently unenforceable by any known means," he concluded that any plan for partial or total atomic disarmament would have to be "clearly and unequivocally advantageous" to the United States and that any proposal would have to benefit the United States, even if the Soviet Union rejected it. Such an agreement would have to be "independent of reliance upon continued good faith or enforcement," because absolute accountability for all fissionable material produced would be impossible. The agreement would have to be acceptable to non-nuclear nations and could not rely on international ownership, control, or operation of any facilities within the United States or Soviet Union.[81]

Building on Eisenhower's idea, Strauss proposed that all uranium and thorium mines be shut down for ten years. All plutonium production reactors

would cease operation except for one facility in each country for producing radioactive isotopes for research. Each nuclear nation would deliver a fixed amount of fissionable material each month to a "World Atomic Power Administration." To provide maximum protection for the material, Strauss proposed that it be stored as a highly diluted solution in underground tanks at some isolated location such as Ascension Island or be dispersed to a large number of scattered sites. Strauss acknowledged that the plan would not immediately reduce the threat of biological, nuclear, or conventional warfare, but it did offer "a means of impounding gradually the devastation of atomic warfare and, by its simplicity and plausibility, it would be likely to attract the adherence of the small neutrals and the enthusiastic support of plain people. . . ."

Strauss' preoccupation with the security aspects of the proposal was not likely to appeal to Eisenhower or Jackson, but the plan did embody the President's basic strategy -- to approach world disarmament, not in one dramatic proposal, but in small steps that would be in tune with existing realities and simple enough for the public to understand. Complex plans for balanced reductions of both nuclear and conventional armaments, such as the State Department proposed in October 1953, were not amenable to presentation in a presidential address but would require months, if not years, of secret diplomatic negotiations. In the autumn of 1953 Eisenhower had no intention of limiting the Administration's efforts to diplomatic channels.[82]

Despite the debacle which had overtaken Operation Candor in September, Eisenhower had never abandoned the idea of speaking out on the growing dangers of nuclear warfare. Always before, the overwhelming pessimism of the Candor drafts had caused the President to hold back; but Strauss' plan, which offered a small but positive hope for a way out of the nuclear dilemma, now seemed to make Candor possible. A special opportunity lay in the fact that the United Nations General Assembly was then meeting in New York. A speech there would give Eisenhower a world, rather than just a national, platform.

Late in October Jackson began to assemble the ingredients for a speech before the General Assembly. From the dozen drafts of the Candor speech, he could extract the grim statistics on the nuclear arms race: the destructive capability of the United States' nuclear stockpile compared to that of all the munitions used in World War II and the fact that the Soviet Union had the hydrogen bomb. From the State Department's latest proposal he could borrow material that would describe the trouble spots in Europe, Korea, and Southeast Asia that were breeding grounds for new global conflicts. From Strauss' paper he could extract the proposal for a positive contribution to world peace.

The essential structure and tone of the speech were fixed on November 6 when Jackson read his second draft aloud to the President, Strauss, and United Nations Ambassador Henry Cabot Lodge, but revisions continued apace. The fifth draft completed on November 28 barely survived a sustained attack by Secretary of Defense Wilson and his deputy, Roger M. Kyes. Undaunted, Jackson immediately began work on a sixth draft, which he expected to have ready in a few days.[83]

THE BORDEN LETTER

Although both Strauss and Nichols would have been happy to see Oppenheimer excluded from national security information, neither man wanted to precipitate that action in a way that would damage the atomic energy program or their own effectiveness as government officials. They had bided their time too long on the Oppenheimer case to take any rash or ill-considered action. Yet, within a week after Nichols took over as general manager, William Borden, most likely

without contacting either Strauss or Nichols, dispatched to the FBI a letter that was destined to change the lives of all four men.

On November 12, Lou B. Nichols, an FBI official in Washington, received a letter addressed to J. Edgar Hoover from Borden, whom he had known as executive director of the Joint Committee. After reviewing the extraordinary scope of Oppenheimer's activities in national security affairs since World War II, Borden concluded that Oppenheimer was and for some years had been "in a position to compromise more vital and detailed information effecting the national defense and security than any other individual in the United States." As chairman or as a member of "more than thirty-five important Government committees, panels, study groups, and projects, he [had] oriented and dominated key policies involving every principal United States security department and agency except the FBI." Then without so much as a sentence of transition, Borden went to the purpose of his letter: "to state my own exhaustively considered opinion, based on years of study of the available classified evidence, that more probably than not J. ROBERT OPPENHEIMER is an agent of the Soviet Union."[84]

Borden's charges were so serious that they could not be ignored, but Agent Nichols and his associates at the FBI received the letter with some skepticism. Why had Borden waited so long after leaving the Joint Committee to make his charges? Did he really have some evidence against Oppenheimer or was he merely trying to put his worst fears on the record? Borden had not backed up his letter with any solid evidence of Oppenheimer's alleged treason but merely summarized in single sentences some twenty instances purporting to show Oppenheimer's ties with Communists. The FBI staff noted that Borden's allegations followed the F.B.I. summary of Oppenheimer's file, "except Borden has included his own interpretations and conclusions, which are not factual in every instance." Because Borden's reliability was in doubt, the FBI staff proposed to Hoover that he send a special agent to Pittsburgh to interview Borden to determine whether he had any concrete evidence. In the meantime the FBI wanted to keep Borden's letter from leaking to Oppenheimer or the press, but the FBI felt compelled to warn all departments and agencies that had granted Oppenheimer access to classified information. Painstaking review of the draft within the FBI delayed dispatch of the letter until November 27.[85]

BORDEN AND McCARTHY

Concurrent events explained the extreme sensitivity that the FBI exercised in handling the Borden letter. On November 6, the day before Borden mailed his letter, Herbert M. Brownell, Jr., Eisenhower's attorney general, accused former President Truman of nominating Harry Dexter White to be director of the International Monetary Fund despite the fact that he knew White had been a communist spy. Thereafter Truman went on nationwide radio and television to defend himself, accusing Brownell and the Eisenhower Administration in turn of "McCarthyism."

As the issue of McCarthyism boiled up in the Nation's press, Murray became increasingly concerned about Strauss' growing tendency to immerse himself in security matters. As he told J. Edgar Hoover on November 23, he was shocked that Strauss had employed as his special assistant David S. Teeple, a former aide to Senator Hickenlooper and one-time security investigator for the Manhattan project, a man known around Washington for his excessive zeal in security matters. Teeple, at Strauss' behest, was reported digging around in old files and launching "many investigations into things that had happened in the past." Murray asked Hoover whether the FBI had given Strauss any information which had caused him to employ Teeple and step up security activities. At first Hoover could think of nothing out of the ordinary, but then

recalled somewhat nonchalantly, the Oppenheimer case. He mentioned to Murray his efforts during the spring of 1953 to head off Senator McCarthy and his special investigator, Roy Cohn. Hoover was convinced that McCarthy had been successfully contained. Almost as an afterthought, Hoover mentioned the Borden letter. Hoover could not explain why Borden had written the letter, but he supposed that Borden "had a lot of these things on his mind and decided more or less to dump them into the lap of the FBI." Giving Murray no indication he was particularly alarmed by the Borden letter, Hoover promised to send Murray copies of all important FBI communications with the Commission, including special reports to the chairman and a copy of the Borden letter.[86]

Hoover was correct in asserting that he had steered McCarthy away from the Oppenheimer case. On the day after Murray's visit to the FBI, McCarthy demanded and received equal time over radio and television to respond to Truman. According to C.D. Jackson, McCarthy's sensational speech, aside from announcing an open season on lambasting Truman, openly "declared war on Eisenhower."[87] While the Borden letter was still in FBI channels, Eisenhower and his staff at the White House discussed the President's response to McCarthy. C.D. Jackson and others in the Administration argued that appeasement of McCarthy would wreck the Republican party and lead it to defeat in 1954 and 1956. Eisenhower, however, was adamant; on December 2 he declared he would not "get in the gutter" with McCarthy.[88]

On that same day Hoover began to receive responses to his memorandum forwarding the Borden letter and the Oppenheimer summary to the White House and the heads of seven departments and agencies. The first to call was Secretary of Defense Wilson, who was "shocked" by the news. He recalled the Wheeler incident and wondered whether Oppenheimer might have been involved with Wheeler in the loss of the top secret document. Wilson had already talked to Brownell and Strauss, who had said he did not know whether Oppenheimer was a communist, but he knew that the scientist was a "liar." Wilson wanted to be certain that Oppenheimer was cut off from any access to classified Defense information. Hoover suggested that Wilson consult General Cutler at the White House and Strauss before taking any formal action. Hoover also reminded Wilson that the FBI had not yet interviewed Borden about his letter.[89]

Apparently dissatisfied with Hoover's cautious approach, Wilson called Eisenhower directly. Because Cutler had not yet brought the matter to the President's attention, Eisenhower did not at first know what Wilson was talking about. But as the Secretary proceeded to describe the FBI summary of the Oppenheimer case and the charges in the Borden letter, which both he and Strauss had received, the President became greatly concerned. "Jolted" by the news about Oppenheimer, Eisenhower bravely professed not to be worried about the McCarthy threat, but his subsequent action that day showed that he did not take the matter lightly.[90] The President sent immediately for Strauss, who found Cutler and others gathered in the Oval Office when he arrived at the White House. The President was determined to act quickly, but he wanted to check first with Attorney General Brownell to make certain that the evidence against Oppenheimer was solid. The next morning, before the meeting of the National Security Council, Eisenhower met with Wilson, Strauss, Under Secretary of Defense Kyes, and Cutler to decide what should be done. Still deeply troubled, the President directed that, pending further investigation, "a blank wall" should be placed between Oppenheimer and any sensitive or classified information.[91]

Just how that "blank wall" was to be constructed, the President left to Strauss and others to decide. The most obvious measure was to revoke Oppenheimer's clearance for atomic energy information, a step which Strauss

immediately explored. Hoover saw two dangers in this approach. First he worried that Oppenheimer, who was then traveling in Europe, might defect to the Soviet Union if he learned of the action against him before he returned to the United States. Secondly, Hoover warned that lifting Oppenheimer's clearance would give him the opportunity to request a public hearing. Hoover feared that unless the evidence against Oppenheimer was convincing, he might use clever lawyers to vindicate himself and "then a martyr would have been made of an individual who we know morally is a security risk." Much of the evidence against Oppenheimer, Hoover contended, could not be introduced in a public hearing without revealing confidential sources. Furthermore, Hoover was not at all confident of Borden's reliability. He had dispatched an FBI agent to Pittsburgh to interview Borden that evening. Unless Borden had some solid evidence against Oppenheimer, Hoover was not sure that the government would have a good case.[92]

Hoover much preferred the alternative of disbanding the one government committee of which Oppenheimer was still a member (in the Office of Defense Mobilization) so that his clearance would automatically lapse. Abolishing that committee, however, was found impractical and Strauss noted that merely allowing the clearance to lapse would not be sufficient to cut Oppenheimer's many lines of communication with scientists in the atomic energy establishment. Strauss in fact on the afternoon of December 3 considered notifying the directors of all the Commission's laboratories that Oppenheimer's clearance had been suspended. But both LaPlante and Hoover warned Strauss that such a directive would likely leak to Oppenheimer, who might then decide to defect. Thus, Strauss decided to revoke the clearance but to issue no instructions to the field and to delay informing Oppenheimer until he returned to the United States on December 13. Running through all these discussions on December 3 was the pressure to act quickly. As Cutler told Strauss, "he wanted a record established of very prompt action."[93] Such a record would presumably protect the President in any subsequent investigation by McCarthy, and the best way to take prompt action was to suspend Oppenheimer's clearance.

As Nichols astutely observed, there was an important coincidence between the Harry Dexter White-McCarthy incident and the Oppenheimer case.[94] Indeed, McCarthy had forced the President's hand in dealing with Oppenheimer, but not for the reasons that were generally assumed. Eisenhower had little reason to fear that McCarthy would exploit the Oppenheimer case, but in the atmosphere created by Brownell's charges against Truman and then McCarthy's accusations against the Administration, Eisenhower knew that he faced a crisis of confidence with his immediate staff. McCarthy had presented the inexperienced President a delicate political problem to which he instinctively responded with caution approaching timidity. The Oppenheimer case, however, lay in the familiar area of national security where, cloaked in secrecy, the former general could react with the same kind of dramatic swiftness that he had demonstrated in the Wheeler affair. In short, with Dulles, Jackson, and others worried about presidential leadership, it was almost inevitable that Eisenhower would respond boldly to Borden's challenge.

Strauss may have been correct when he said that the President wanted to get rid of Oppenheimer. But as Eisenhower wrote in Mandate for Change, the charges against Oppenheimer "were brought not by an unknown citizen," but by Borden, who had directed the Joint Committee staff "under the preceding Democratic administration, and who obviously was aware of the gravity of his charges." Under the circumstances, which included the fact that the President was due to leave for an international conference in Bermuda, Eisenhower had few alternatives. There was no time for a calm and leisurely deliberation.

Finally, since Eisenhower had no direct knowledge of the Oppenheimer file except through Hoover's report, and no authority to revoke the physicist's clearance by presidential order, he could only suspend Oppenheimer's access to classified information pending a hearing by the Atomic Energy Commission. Thus, almost before anyone knew it, events had advanced to the point where there were few viable options left.[95]

ATOMS FOR PEACE

On the morning of December 3, 1953, before the meeting of the National Security Council that decided Oppenheimer's fate, the President reviewed C.D. Jackson's sixth draft of the United Nations speech with Strauss, Wilson, Dulles, and Kyes. Jackson later wrote that Wilson was "still mumbling around in his cave," but Kyes had reversed himself after his bitter attack on November 30. The session resulted in a few more changes that Jackson managed to complete later that day.[96]

Eisenhower probably would have addressed the General Assembly in November had it not been for the Bermuda Conference with Prime Minister Winston Churchill and Premier Joseph Laniel of France. Because the British and French leaders had not been told of the plan, the President decided not to seek an invitation from the United Nations until he had arrived in Bermuda. Strauss explained his proposal for a nuclear pool to Lord Cherwell, Churchill's scientific advisor. Although Cherwell predicted that the pool would be difficult to establish, he agreed to support the plan. Churchill, who had already read the speech, then approved it with only a few suggestions for minor changes, which Eisenhower accepted.[97]

Arrangements had been made for the presidential party to fly directly from Bermuda to New York, where Eisenhower was to address the General Assembly on December 8. As soon as the President boarded the plane, he called Dulles, Strauss, Jackson, and James Hagerty, his press secretary, to his cabin and began to edit the speech line by line. As each page was completed, it was retyped on stencils and reproduced on a mimeograph machine in the rear luggage compartment. As the plane approached LaGuardia Field, Dulles, Strauss, and others helped to staple copies that would be distributed at the United Nations.[98]

As Eisenhower mounted the rostrum at the General Assembly that December afternoon, he was realizing a hope he had been pursuing since the first weeks of his administration--to arrest, and if possible to reduce, the growing danger of a world holocaust made possible by the development of fission and thermonuclear weapons. The United States proposed that the nuclear nations "begin now and continue to make joint contributions from their stockpiles of normal uranium and fissionable materials to an International Atomic Energy Agency" to be established under the aegis of the United Nations.[99]

In nine weeks the President had moved far beyond Strauss' proposal for an international pool of fissionable material. Instead of isolating the material in underground tanks, Eisenhower was now proposing to use it to develop power for peaceful purposes. "Who can doubt," the President asked, "if the entire body of the world's scientists and engineers had adequate amounts of fissionable material..., that this capability would rapidly be transformed into universal, efficient, and economic usage." Nuclear power itself was to save the world from nuclear devastation.

Balancing the nuclear threat with nuclear power was an idea that Eisenhower seemed to have vaguely in mind in his very first comments to Snapp in Augusta more than a year earlier. It was an idea appealing in its simplicity and directness. It electrified the United Nations General Assembly and the world as few political statements had since Bernard Baruch's address in June 1946.[100]

But in the very simplicity of the idea lay its limitations. Could atomic energy, which had heightened world tensions and distrust, now become a unifying force for peace? And was nuclear power as imminent as the President seemed to think? These were questions the Atomic Energy Commission would have to answer.

NOTES

1. Public Papers of the Presidents of the United States, 1953: Dwight D. Eisenhower (Washington: Government Printing Office, 1960), p. 2 (hereafter cited as Public Papers, 1953, Eisenhower).

2. Durham to Eisenhower, Jan. 29, 1953; Eisenhower to Durham, Feb. 14, 1953, both in AEC.

3. Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. II of A History of the U. S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), pp. 369-408 (hereafter cited as Atomic Shield).

4. Ibid., pp. 438-39, 529-41, 554-56, 569-71.

5. Joint Committee on Atomic Energy, Transcript of Hearing on Status of Atomic Energy Program, Feb. 6, 1952, AEC.

6. Joint Committee on Atomic Energy, Transcript of Hearing on Status of Hydrogen Project, Feb. 21, 1952, AEC.

7. R. A. Lovett to McMahon, March 9, 1952, AEC.

8. Foster to Acheson and Dean, March 28, 1952; Secretaries of Army, Navy, and Air Force to Secretary of Defense, March 27, 1952; Dean to Files, April 1, 1952, all in AEC.

9. Minutes, 30th Meeting of the General Advisory Committee (hereafter cited as GAC 30), April 27-29, 1952, AEC.

10. Bethe to Dean, May 28, 1952, with attachment, Bethe to Dean, May 23, 1952; Teller to Garrison Norton, Aug. 15, 1952, transmitting Comments on Bethe's history, both in AEC.

11. C. A. Rolander and R. Robb, Informal Interview with William L. Borden, Feb 20, 1954, AEC.

12. Wheeler, Statement on Loss of Classified Document, March 3, 1953, AEC.

13. Joint Committee on Atomic Energy, Policy and Progress in the H-Bomb Program: A Chronology of Leading Events, Jan. 1, 1953, JCAE.

14. No copy of the Walker document was found in AEC files. Description of the contents has been reconstructed from various reports and correspondence on the incident, e.g., Bethe, Bradbury, Teller, and von Neumann to the Commissioners, March 2, 1953, AEC.

15. Hoover to Waters, Jan. 9, 1953, AEC.

16. Chronology of Missing Document, AEC 634/1, April 16, 1953; Waters to File, Feb. 4, 1953, both in AEC.

17. Murray, Meeting with Eisenhower, Feb. 16, 1953, TEM.

18. Atomic Energy Act of 1946, P.L. 585, 79 Cong., 60 Stat. 755-75, 42 U.S.C., 1801-19, Sect. 15 (b).

19. National Security Council, Summary of Discussion, Meeting 132, Feb. 18, 1953 (hereafter cited as SNSC), DDE.

20. Public Papers, 1953, Eisenhower, pp. 40-41; New York Times, Feb. 12, 1953, p. 1. In late 1952 the Rosenberg case had suddenly become an international cause celebre. Simultaneoulsy the Supreme Court refused to review the case, leaving Presidential clemency the Rosenbergs only hope. See: Ronald Radosh and Joyce Milton The Rosenberg File: A Search for the Truth (New York: Holt, Rinehart, and Winston, 1983), pp. 330, 335, and 347-49, (hereafter cited as Radosh and Milton, The Rosenberg File).

21. The value of the data the Rosenbergs allegedly passed on is examined in Radosh and Milton, The Rosenberg File, pp. 432-49 and Roger M. Anders, "The Rosenberg Case Revisited: The Greenglass Testimony and the Protection of Atomic Secrets," American Historical Review 83 (April 1978), 388-400. Durham to Eisenhower, Jan. 29, 1953; Eisenhower to Durham, Feb. 14, 1953, both in AEC.

22. Department of State, Panel of Consultants on Disarmament, Arms and American Policy, second run, Jan. 1953, DOS.

23. SNSC 132, Feb. 18, 1953, DDE.

24. SNSC 133, Feb. 25, 1953, DDE; Dean Diary, Feb. 24, 1953, AEC.

25. John Major, The Oppenheimer Hearing (London: B. T. Batsford, 1971), p. 252 (hereafter cited as Major, The Oppenheimer Hearing).

26. Borden to Strauss, Sept. 10, 20, 1952, LLS.

27. Philip M. Stern, The Oppenheimer Case: Security on Trial (New York: Harper & Row, 1969), p.169 (hereafter cited as Stern, The Oppenheimer Case); Joint Committee Working Paper, Nov. 3, 1952, AEC.

28. Stern, The Oppenheimer Case, pp. 102-103; Atomic Shield, pp. 13-14.

29. Lewis L. Strauss, Men and Decisions (Garden City, N.Y.: Doubleday, 1962), pp. 270-74 (hereafter cited as Strauss, Men and Decisions).

30. Drew Pearson, Newark Star Ledger, April 20, 1954; Joseph and Stewart Alsop, We Accuse! (New York: Simon & Schuster, 1954), p.7; Stern, The Oppenheimer Case, pp.128-30; Joint Committee on Atomic Energy, Hearings on an Investigation into the United States Atomic Energy Project, (Washington: Government Printing Office, 1949), pp.277-315.

31. Stern, The Oppenheimer Case, pp. 178, 190-91, 204-05; D.M. Ladd to Director, FBI, Jan. 23, 1952; Hoover to Sidney W. Souers, March 26, 1952; L.B. Nichols to Mr. Tolson, March 28, 1952; Hoover to Souers, May 19, 1952; W.A. Branigan to A.H. Belmont, June 10, 1952, all in FBI; Major, The Oppenheimer Hearing, pp. 263-64.

32. Dean Diary, Nov. 24, 26, Dec. 1, 4, 1952, AEC; Atomic Shield, p. 519. Cotter sent Borden two memos on the Weinberg case, Dec. 2 and Dec. 8, 1952, JCAE. For Borden's interest in Oppenheimer's Berkeley activities, see Borden to E.O. Lawrence, Dec. 23, 1952, Jan. 13, 1953, and Borden to File, Jan. 17, 1953, all in AEC.

33. Joint Committee Working Paper, Nov. 3, 1952, JCAE; Hoover to Dean with FBI report on Wheeler incident, March 11, 1953; Transcript of Dean's testimony before the Joint Committee, March 24, 1953; Cole to the Attorney General, undated but about April 20, 1953; Cole to Dean, April 27, 1953, all in AEC 634/5, May 5, 1953; Attorney General to Dean, March 11, 1953, in AEC 634, March 24, 1953; Dean to Attorney General, April 3, 1953, all in AEC.

34. Strauss Telephone Log, April 28, 1953; Strauss Appointment Calendar, April 30, 1953, both in AEC. On April 28, Strauss talked with Trevor Gardner, Ernest Lawrence, Kenneth D. Nichols, Kenneth S. Pitzer, Luis Alvarez, and Leslie R. Groves.

35. "The Hidden Struggle for the H-Bomb," Fortune 47 (May 1953), 109-10, 230.

36. The Air Force's effort to remove Oppenheimer's influence over national military policy has been extensively described, first in the Oppenheimer Hearings and more recently in secondary sources. See: U. S. Atomic Energy Commission, In the Matter of J. Robert Oppenheimer: Transcript of Hearing Before Personnel Security Board (Washington: Government Printing Office, 1954), pp. 681-85, 744-54; Stern, The Oppenheimer Case, pp. 178-98; Major, The Oppenheimer Hearing, pp. 238-63.

37. The four were: Ellis M. Zacharias, Oppenheimer, Isidor I. Rabi, and Charles C. Lauritsen. The FBI later tried to run down the source of the ZORC story. SAC, Newark to Director, FBI, April 3, 1954; Branigan, to Belmont, June 3, 1954; Hoover to Waters, June 4, 18, 1954; FBI Investigative Report, June 21, 1954, all in FBI.

38. Nichols to Tolson, May 11, 1953, and Hoover to Tolson et al., May 19, 1953, both in FBI.

39. Robert A. Divine, Eisenhower and the Cold War (New York: Oxford University Press, 1981), pp. 106-08; Public Papers, 1953, Eisenhower, pp. 179-84; NSC 151, Armaments and American Policy, May 8, 1953, AEC.

40. Waters to File, May 14, 1953, AEC.

41. Joint Committee Working Paper, May 29, 1953, AEC.

42. Ladd to Hoover, May 25, 1953, FBI.

43. R.B. to Mr. Stevens, May 18, 1953, President's Personal File, DDE.

44. R.W. Kirkman, director of AEC security at New York, to Waters, May 26, 1953, with encl., Oppenheimer to Mr. Marin, May 19, 1953, AEC.

45. SNSC 146, May 27, 1953, DDE; Lay to Dean, May 29, 1953, AEC.

46. Belmont to Ladd, June 5, 1953, FBI.

47. Dean Diary, June 5, 1953; W.J. Williams Diary, June 5, 1953; AEC Contract AT (49-1)-805, Mod. 1, June 5, 1953, all in AEC; Strauss, Men and Decisions, p. 275.

48. Edmund A. Gullion of the State Department began working on drafts of the speech in June. His first, third, and fifth drafts, dated June 16, 22, and July 17, 1953, are in DDE. James H. Lambie of the White House staff handled day-to-day contacts with the Advertising Council. See Lambie to Adams, July 9, 1953; Lambie to Cutler, July 29, 1953, both in DDE; Jackson to T.S. Repplier, president of the Advertising Council, June 4, 1953; Jackson to Cutler, June 24, 1953; Cutler to Dean, June 26 1953; Cutler to Jackson, July 20, 1953, all in DDE.

49. See statement by Jules Halpern, chairman, Federation of American Scientists in Bulletin of the Atomic Scientists 8 (Dec. 1952), 299.

50. J.R. Oppenheimer, "Atomic Weapons and American Policy," Foreign Affairs 31 (July 1953), 525-35.

51. Joint Task Force 132, Film on Operation IVY, uncut version, AEC.

52. Dean Diary, May 21, 22, 25, 29, June 1, 2, 1953; Cutler to the Commissioners, May 29, 1953, all in AEC.

53. Dean, Press Conference, June 25, 1953, AEC; Christian Science Monitor, June 27, July 1, 1953; Washington Post, June 19, 1953, p. 4; New York Times, June 19, 1953; Los Angeles Times, July 3, 1953; Wall Street Journal, June 30, July 1, 1953; Memphis Commercial Appeal, Aug. 7, 1953.

54. Public Papers, 1953, Eisenhower, p.476. The Commissioners were given a copy of the transcript in AEC 111/26, July 16, 1953. Washington Post, June 27, 1953, p. 8.

55. Smyth, Analysis of Secrecy, AEC 111/25, June 17, 1953, AEC.

56. CM 889, July 17, 1953; CM 897, July 28, 1953, both in AEC.

57. Wiley to Strauss, Aug. 7, 1953, in AEC 111/30, Aug. 17, 1953; Strauss to Wiley, Aug. 19, 1953, in AEC 111/32, Aug. 24, 1953, both in AEC.

58. CM 887, July 14, 1953; CM 892, July 22, 1953; CM 894, July 24, 1953; CM 896, July 27, 1953; CM 898, July 29, 1953; CM 902, Aug. 5, 1953; CM 904, Aug. 13, 1953, all in AEC.

59. Strauss Telephone Log, May 25, 29, June 23, July 16, 1953; Strauss Appointment Calendar, June 23, July 10, July 23, 1953, both in AEC; Murphy, "The Atom and the Balance of Power," Fortune 48 (August 1953), 97, 202.

60. Jackson to Strauss, Aug. 5, 1953; Jackson Logs, Aug. 4, 1953, both in CDJ.

61. The full text of Malenkov's speech appeared in the New York Times, Aug. 10, 1953, p. 6. AEC Press Release 494, Aug. 8, 1953, AEC.

62. Draft press announcements, Aug. 14, 1953, AEC.

63. Strauss, Memo Files, Aug. 19, 1953; AEC Press Release 495, Aug. 20, 1953, both in AEC. The headline appeared in the New York Journal-American, Aug. 20, 1953. Similar headlines appeared in the Washington Post and Washington Times-Herald, Aug. 20, 1953. The New York Times carried a page-one feature story but no headline. C.D. Jackson Logs, Aug. 14-16, 1953, CDJ. The text of the Soviet announcement appeared in the Washington Evening Star and other papers on Aug. 20, 1953.

64. Cole to Eisenhower, Aug. 21, 1953, AEC; New York Times Aug. 21, 1953, p. 1. Articles containing excerpts from Cole's American Legion speech appeared in the New York Herald-Tribune and many other papers on Oct. 13, 1953. Strauss' concern, expressed in MLC 84, Aug. 27, 1953, AEC, was confirmed many years later by Andrei Sakharov in an article quoted by Herbert F. York, Oppenheimer, Teller, and the Superbomb (New York: Norton, 1975), pp. 101-3. For Eisenhower's statement, see Public Papers, 1953, Eisenhower, p. 617.

65. American analyses of Joe 4 appear in Carson Mark to John von Neumann, Sept. 4, 1953; Strauss to Cole, Oct. 27, 1953; Bethe, Summary of Preliminary Findings, Dec. 26, 1953; von Neumann to Cole, Nov. 23, 1953; Bethe to Strauss, Dec. 30, 1953, all in AEC. On the Commissioners' lack of information, see Zuckert to Strauss, Sept. 22, 1953, AEC.

66. Eisenhower to Jackson, Aug. 24, 1953; Jackson to R. G. Arneson, Sept. 2, 1953; John A. DeChant to Jackson, Sept. 3, 1953, all in DDE. See also Sherman Adams, Firsthand Report: The Story of the Eisenhower Administration (New York: Harper, 1961), pp. 109-10; Robert J. Donovan, Eisenhower: The Inside Story (New York: Harper, 1956), pp. 184-85 (hereafter cited as Donovan, Eisenhower).

67. Cutler to Jackson, Sept. 3, 1953; Safety of the Republic, Sept. 9, 1953, both in DDE. A transcript of the June 3, 1953, television report is in Public Papers, 1953, Eisenhower, pp. 363-76.

68. Abbott Washburn to Jackson, Sept. 14, 1953, DDE.

69. Lambie to Arneson et al., Sept. 28, 1953, DDE; James Reston in the New York Times, Sept. 23, 1953, presented a detailed and essentially accurate story of Candor. Arthur Krock in the New York Times, Oct. 8, 1953; Strauss, Remarks for National Security Industrial Association, New York City, Sept. 30, 1953; Strauss to the Commissioners, Oct. 6, 1953, both in AEC; New York Times, Review of the Week, Oct. 11, 1953; Newsweek, Sept. 28, 1953, p. 28; Wilson, Excerpts from Press Conference, Sept. 29, 1953, p. 2, AEC.

70. SNSC 165, Oct. 7, 1953, DDE; Strauss to Eisenhower, Oct. 7, 1953; Lay to NSC, Oct. 8, 1953, both in AEC.

71. Hickenlooper's statement was reported in the Baltimore Sun, Oct. 5, 1953; President's News Conference, Oct. 8, 1953, in Public Papers, 1953, Eisenhower, pp. 644-48.

72. No copy of the Sept. 10 memo from Cutler to Jackson and Strauss was found in DDE, CDJ, or AEC. The memorandum is quoted in Strauss Men and Decisions, p. 357 and Donovan, Eisenhower, pp. 185-86.

73. Stern, The Oppenheimer Case, pp. 204-05.

74. Hoover to Tolson and Ladd, June 24, 1953, FBI.

75. Murray Diary Memo, June 9, Aug. 18, 1953, TEM; Waters to Strauss, May 12, 1954; W.J. Williams Diary, Aug. 31, 1953, both in AEC; Ladd to Belmont, Aug. 28, 1953, FBI.

76. Belmont to Ladd, Sept. 10, 1953; Director, FBI to SAC, Field, Sept. 14, 1953, both in FBI.

77. John Luter, Oral History Interview with Nichols, Oct. 12, 1967, DDE; Richard G. Hewlett and Oscar E. Anderson, Jr., The New World, 1939-1946, Vol. I of A History of the U.S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1962), pp. 649-50, 653.

78. Murray Diary Memo, Sept. 2, 1953, TEM.

79. CM 1007, June 15, 1954, AEC.

80. Strauss, Men and Decisions, pp. 357-58. For the development of Atoms-for-Peace from the President's perspective, see: Stephen E. Ambrose, Eisenhower, the President (New York: Simon & Schuster, 1984), pp. 131-153.

81. Donovan, Eisenhower, pp. 186-87, refers to several documents which have not been found in DDE, CDJ, or AEC. The first draft of the Strauss memorandum, dated Oct. 26, 1953, is in DDE; the second draft with a letter to Jackson, Nov. 6, 1953, is in CDJ.

82. Dulles to Cutler, Oct. 13, 1953, with State Department draft, "For Second Half of Atomic Speech"; Summary of Discussion of State Draft, Oct. 19, 1953, both in CDJ.

83. Copies of the five drafts, dated Nov. 3, 5, 22, 28, and Dec. 1, 1953, are in DDE. See also Jackson to Emmit Hughes, Nov. 6, 1953; Jackson to Strauss, Nov. 28, 1953, both in DDE, and C.D. Jackson Logs, Nov. 30, Dec. 3, 1953, CDJ.

84. Borden to Nichols, Nov. 7, 1953; Borden to Hoover, Nov 7, 1953, both in FBI.

85. Belmont to Ladd, Nov. 19, 1953, FBI.

86. Murray Diary Memo, Nov. 23, 1953, TEM.

87. C.D. Jackson Logs, Nov. 27, 1953, CDJ.

88. Ibid., Dec. 2, 1953, CDJ.

89. Hoover to Tolson, Ladd, and Nichols, 9:22 a.m., Dec. 2, 1953, FBI.

90. Eisenhower, Mandate for Change, 1953-1956 (New York: Doubleday, 1963), pp. 310-11 (hereafter cited as Eisenhower, Mandate for Change).

91. Strauss incorrectly records his late afternoon visit to the White House as being on Dec. 3, not Dec. 2. The Dec. 3 date would suggest that the decision had been made before Strauss arrived. In fact the evidence indicates that Eisenhower discussed his intentions with Strauss and others on Dec. 2 and made the decision the same day. Strauss, Men and Decisions, p. 267; Eisenhower, Mandate for Change, p. 311; Stern, The Oppenheimer Case, p.220; Strauss Appointment Calendar, Dec. 2, 3, 1953; W. H. Haggard to R. M. Anders, Nov. 12, 1974, with encl., National Oceanic and Atmospheric Admin., Local Climatological Data, Washington, D.C., Dec. 2, 3, 1953, both in AEC; Anne C. Whitman, Memo for the Secretary of State, Dec. 3, 1953, Brownell Folder, DDE; Hoover to Tolson, Ladd, Nichols, and Belmont, Dec. 4, 1953, FBI.

92. Hoover to Tolson, Ladd, and Belmont, 4:52 p.m., Dec. 3, 1953; Hoover to Tolson, Ladd, and Nichols, 5:58 p.m., Dec. 3, 1953, both in FBI. Borden was interviewed in Pittsburgh on the evening of Dec. 3. In a telex to FBI headquarters early on the morning of Dec. 4, the special agent reported that he found Borden "quite intelligent, extremely verbose and inclined toward generalities rather than specifics." Hallford to Inspector Carl E. Hennrich, Dec. 4, 1953, FBI.

93. Hoover to Tolson, Ladd, and Nichols, 4:26 p.m., Dec. 3, 1953; Hoover to Tolson, Ladd, Belmont, and Nichols, Dec. 14, 1954, both in FBI; Bryan LaPlante, Diary Memo, Dec. 3, 1953; Strauss to General Manager, Dec. 3, 1953, both in AEC.

94. Luter, Nichols Inverview, Oct. 12, 1967, DDE.

95. Eisenhower, Mandate for Change, pp. 310-11; C.D. Jackson Logs, Nov. 27-Dec. 2, 1953, CDJ; Major, The Oppenheimer Hearing, pp. 267-69.

96. C.D. Jackson Logs, Dec. 3, 1953, CDJ.

97. Dulles, Memorandum of Conversation with Churchill, Dec. 5, 1953, DDE; Donovan, Eisenhower, pp. 188-89; Strauss, Men and Decisions, pp. 358-59; J.M. Dunford to Murray, Dec. 18, 1953, TEM.

98. Bermuda Draft #3, Dec. 7, 1953, edited on the airplane is in CDJ. See also first version of stenciled copy, Dec. 8, 1953, with handwritten notes by the President, in CDJ.

99. The final version of the speech appears in Public Papers, 1953, Eisenhower, pp. 813-22.

100. Ibid., p. 820. On reactions to the speech, see Henry Cabot Lodge to Jackson, Dec. 10, 1953, enclosing Summary of Reactions to President Eisenhower's Speech, Dec. 9, 1953, DDE.

CHAPTER 4
THE OPPENHEIMER CASE

When Lewis Strauss returned to Washington on December 8, 1953, following the President's speech at the United Nations, he plunged back into the Oppenheimer case. Because Oppenheimer's only significant access to classified information was through his consultant contract with the Commission, Strauss knew that he and his fellow Commissioners would have to undertake on behalf of the government whatever formal action was brought against Oppenheimer. The extreme sensitivity of atomic energy information had prompted the Commission to develop detailed procedures for handling personnel security cases. Since 1947 these procedures had been tested in numerous cases and had come to be regarded by many security experts as a model that other government agencies might well follow.[1] In two respects, however, the Commission's security procedures were not well designed for the impending Oppenheimer case: they had been used almost exclusively at the Commission's field offices rather than at headquarters and they had never been applied to a person of Oppenheimer's prestige and influence.

TROUBLE AT HOME

Strauss' first priority was to set things right with his fellow Commissioners, who knew only that the President had ordered Oppenheimer's clearance suspended. During the hectic hours on December 3, when Strauss was trying both to respond to the President's order and prepare for the Bermuda Conference, there had been no

opportunity for a Commission meeting. Although Smyth had technically served as acting chairman during Strauss' absence in Bermuda, he had been bedridden with a sinus infection and sore throat during that week and had the benefit of only one brief and guarded telephone conversation with Strauss before the chairman's departure. To bring the Commission up to date, Strauss scheduled an executive session for December 10.[2]

Murray was the only Commissioner who had already responded to the events of the previous week. While Strauss was in Bermuda, Murray completed a memorandum that set forth his views on the Oppenheimer case. Reminding Strauss that he had known of Oppenheimer's record since joining the Commission, Murray wanted to make clear that he had not been ignorant of or complacent about the matter. It was his understanding that Oppenheimer's record "was not sufficiently derogatory to call for stopping his access to restricted data."[3] Nevertheless, after reviewing Oppenheimer's "strong negative position" on the hydrogen bomb, Murray believed that the physicist's usefulness had been severely reduced. Murray had been especially determined to eliminate Oppenheimer's unhealthy "excessive influence" over the general advisory committee and had argued in 1951 against the reappointment of Enrico Fermi to the committee in order to establish a strong precedent against Oppenheimer's reappointment a year later. In fact, since he also believed that the paramount interest of the country outweighed "any possible question of equity to an individual," Murray agreed that Oppenheimer's access to classified information should be terminated if there were "any shadow of doubt on the security of vital information accessible to Oppenheimer," and "from a reading of the FBI report, I would like to record that I don't reach the conclusion that Borden does."[4]

Thus Murray served Strauss notice that he was in sympathy with the move to dump Oppenheimer, but would not support the use of the security system to achieve that end. Unfortunately Murray's voice was somewhat muted because

circumstances prevented him from developing his statement fully. In a memorandum ultimately sent to Strauss, Murray confessed that for the past three years he had discussed various security matters with Hoover, who had briefed him on the Oppenheimer case. What Murray could not tell Strauss was Hoover's earlier statement that "there was not sufficient derogatory evidence in the FBI files to call for AEC's ending Oppenheimer's access to restricted data," a considerably stronger reservation than the one ultimately given to Strauss. Rejecting Murray's statement in the draft memorandum, Hoover denied that he had ever expressed such a definite opinion and requested Murray to eliminate specific mention of their conversations about Oppenheimer, particularly those that had taken place during the Weinberg case in November 1952. After negotiating with two of Hoover's agents, Murray agreed to amend his statement by deleting "the fact that Mr. Hoover expressed any opinions about Oppenheimer,"[5] but he retained reference to his special knowledge of the Oppenheimer case.

Originally Murray intended to recommend that the Oppenheimer case be referred to the special committee on atomic energy of the National Security Council, a maneuver which would obviously diminish Strauss' role in any future proceedings against Oppenheimer. Without success Murray sought support for his proposal among the other Truman appointees to the Commission, Smyth and Zuckert. In a conference of the three men prior to the December 10 executive session, Murray read his memo but failed to receive the approval of either of his two colleagues. Without promising their support or disagreeing with Murray, they left the whole matter in limbo. At the moment another issue seemed even more important than the Oppenheimer case. They had just learned that Strauss had been working on Eisenhower's Atoms-for-Peace speech without their knowledge. This information not only damaged their pride but also suggested that Strauss was usurping their functions as Commissioners. Thus the "Bermuda crisis," as they called it, loomed as large as the Oppenheimer case itself. Just before the three Commissioners entered the executive meeting,[6] Smyth and Zuckert both spoke openly of resigning.

From the outset the Oppenheimer case threatened to become a partisan issue. Joseph Campbell, Eisenhower's other Republican appointee, was the only Commissioner with whom Strauss really confided on December 3. Campbell met Strauss at the airport on December 8 and accompanied by two aides drove to Strauss' apartment at the Shoreham to brief the chairman. Strauss told Campbell that he had an appointment the morning of December 9 to discuss the Oppenheimer case with the President, Brownell, and Authur S. Flemming, director of the Office of Defense Mobilization. Strauss met again with Brownell and Flemming at the Department of Justice the following day after the conclusion of the National Security Council meeting.[7]

Strauss opened the executive session on December 10 by reviewing the events of December 3 but omitting his meeting with the President. On receiving the President's directive, Strauss explained, he had immediately called a meeting of the Commission, which had been attended only by Campbell. The Chairman did not tell them that he had met with Flemming and Brownell, but he did note that he intended to consult with Brownell. There were no objections. Then Strauss took cognizance of Murray's independent contacts with Hoover by announcing that he intended to ask Hoover to keep all the Commissioners advised.[8]

THE STATEMENT OF CHARGES

The first step in a personnel security investigation was to prepare a statement of charges. Usually an attorney in one of the field offices performed this task, but because of the exceptional nature of the Oppenheimer case, Strauss asked William Mitchell, the Commission's general counsel, to draw up

the statement himself. Mitchell, just fifty years old, had been educated at Princeton and Harvard and had practiced law in Minnesota and the District of Columbia. His service in the Army Air Force during World War II had led to his appointment in the Truman administration as special representative of the President to negotiate civil air transport agreements with several Latin-American countries and as special assistant to the Secretary of the Air Force on overseas bases. As the son of Herbert Hoover's attorney general, however, Mitchell's credentials as a conservative Republican were impeccable. Mitchell's quiet and judicious manner and his unquestioned integrity made him an effective legal advisor to Strauss.

Although Mitchell had broad experience as a lawyer in both private practice and government, he had never before been directly involved in preparing a security case. After several unsuccessful attempts to draft the statement of charges himself, Mitchell obtained Strauss' permission to give the assignment to Harold P. Green, a young lawyer who had worked in the general counsel's office for three years. Green had never read the Oppenheimer file, but he had learned something of Oppenheimer's "checkered past" as an official observer at the Weinberg trial. On Friday afternoon, December 11, Mitchell gave Green two thick volumes of the Oppenheimer file and a copy of the Borden letter. Mitchell explained the background of the "blank wall" directive and the need for secrecy. He asked Green to prepare a statement of charges against Oppenheimer that weekend.[9]

Green was given few instructions except that he was not to focus on Borden's allegations concerning Oppenheimer's opposition to the hydrogen bomb. Green knew from the outset that he was involved in a matter of historic proportions, but he did not suspect that the Oppenheimer case would be handled any differently from routine personnel security reviews conducted by the Commission. Arriving at the Commission at 6:00 a.m. on Saturday, Green began his systematic review of Oppenheimer's file, only to be interrupted twice by Nichols, who summoned him to his office to talk about the case.[10] Well aware that under Commission regulations, Nichols would probably make the final decision about Oppenheimer's fate, Green was disconcerted by Nichols' apparent enthusiasm for the prosecution and the seeming impropriety of taking a position against Oppenheimer's interests.

Green worked steadily through the day until evening. The FBI files before him contained a monotonous rehash of ancient events and stale investigations.[11] The only fresh information of any interest consisted of recent interviews with Teller and Kenneth W. Pitzer, who criticized Oppenheimer for his opposition to the hydrogen bomb; but this material was outside the scope of Mitchell's vaguely defined guidelines. Unable to identify substantial grounds for challenging Oppenheimer's loyalty, Green decided to take a tack common to personnel security cases: to draft charges primarily designed to test Oppenheimer's veracity. Green had no qualms about his strategy. Confident that an experienced and eminent board would review the charges, he selected thirty-one items from the file, almost all of which would allow the prospective board to match Oppenheimer's memory and truthfulness against known and established facts.

When Green finally finished his draft statement of charges at noon on Sunday, he called Mitchell, who wanted to review the draft before submitting it to Strauss, Nichols, and Hoover for concurrence. Thereafter followed what has been described as the "most crucial two-hour period in the entire Oppenheimer affair."[12] Green, waiting alone at the Commission, mulled over his work, becoming increasingly dissatisfied with having ignored the FBI interviews of Teller and Pitzer. Oppenheimer should not be punished because of his opposition to the hydrogen bomb, Green understood, but couldn't his alleged

disingenuousness on the hydrogen bomb issue serve as a pertinent and more timely basis for testing his veracity? With nothing else to do, Green decided to cast several additional charges based on the material found in the unused FBI interviews. Concentrating on the Teller interview, which he found most useful, Green added seven more charges. Teller himself, as the FBI interview made unmistakably clear, did not doubt Oppenheimer's loyalty and thought it wrong to remove him from any office on the grounds of disloyalty. Nevertheless, Teller hoped that Oppenheimer would be removed from all responsibilities connected with military preparedness because of the mistaken advice he had given in recent years. Using the same words as Borden, Teller accused Oppenheimer of "whitewashing" the record of the general advisory committee in an attempt to show, once the weapon had become an inevitability, that the committee had favored its development all along. Here was sufficient grist for Green's veracity mill. When he was done, Green had extended the charges from thirty-one to thirty-eight, producing by coincidence, perhaps, seven H-bomb charges, the same number that Borden had included in his November 7 letter to Hoover.[13]

Satisfied with his draft at last, Green relinquished the manuscript to Mitchell, who made no changes and offered no objections to the paper, including the hydrogen bomb allegations. The next morning Mitchell sent the draft to Nichols, who forwarded it to Hoover without comment. The FBI carefully checked Green's work for accuracy, making certain that its files confirmed all of the charges. Hoover subsequently recommended that two charges be dropped entirely and eleven others be amended either to correct misspellings and incorrect data or to eliminate accusations which could not be substantiated by available witnesses. Hoover mostly confined himself to editorial chores, avoiding substantive comment on the hydrogen bomb charges and the other allegations.[14]

It is tempting to conclude that the hydrogen bomb charges were included in the statement almost as an afterthought and unexplicably were endorsed by the Commission virtually unnoticed and unchallenged. Unfortunately the inclusion of the H-bomb charges was far less accidental than it seemed on the surface. Mitchell had not told Green that he had given up the assignment after Smyth and Zuckert had criticized his attempts to include the H-bomb charges. The fact was that all the Commissioners except Campbell had strong opinions on this question and Smyth had relented on December 14 only with great reluctance.[15]

THE MEETING WITH OPPENHEIMER

Strauss kept the President fully abreast of developments in the case and solicited advice from Eisenhower in turn. Oppenheimer's request for an appointment with Strauss precipitated the issue, and in the President's office it was decided that Strauss should see Oppenheimer, tell him about the President's directive, give Oppenheimer a chance to resign, but should he decide to carry his case further, hand him the statement of charges and offer him the regular hearing procedure. Thus when Strauss convened an executive session on the afternoon of December 15, the Commission was presented with another fait accompli: this time a presidential concurrence in procedures which the Commission itself had not yet approved.[16]

Although Smyth and Murray knew that they could not oppose actions approved by the President, both had deep reservations about the decision. Smyth believed that a formal suspension of clearance would not only be a severe blow to Oppenheimer's reputation but would also tend to prejudice the evidence. There was some chance, in Smyth's opinion, that Oppenheimer's consultant contract could be terminated without raising the clearance question, but Smyth finally decided not to press his objections with his fellow Commissioners because he feared that the case might become a political football in the hands of McCarthy.

Murray shared a similar concern after he had met privately with Cotter, who told him that he knew all about the Oppenheimer case and Borden's role in it. Cotter urged that the Commission consider using a specially appointed presidential panel to hear the Oppenheimer case and he intimated that Cole would support such a move. A few days later Herbert S. Marks, a former general counsel at the Commission, insisted on seeing Strauss to warn him that Senator William Jenner was considering an investigation of Oppenheimer.[17] None of these developments would make it any easier for the Commission to drop the case.

When Oppenheimer kept his appointment with Strauss on December 21, the chairman explained to him that the Commission faced a difficult problem in continuing his clearance. Without naming Borden, the chairman told Oppenheimer how a former government official had called attention to Oppenheimer's record, an action that resulted in an FBI report to the President, who had directed the Commission to subject Oppenheimer's clearance to a formal hearing pursuant to the President's recent executive order. Strauss explained that the first step would be to suspend Oppenheimer's clearance by giving him a letter from the general manager informing the scientist of his rights and the nature of the derogatory information occasioning the suspension of his clearance.[18] Handing Oppenheimer a draft of the letter, Strauss and Nichols waited tensely while Oppenheimer read the charges. Obviously impressed and shaken by the evidence accumulated against him, Oppenheimer inquired whether a board had ever cleared anyone with a similar record. Strauss conceded that he did not believe a comparable case had ever been heard before and he could not venture an opinion on what the outcome might be.

Oppenheimer's resignation was an obvious alternative to a formal hearing and the two men discussed that option at some length.[19] It became evident to Oppenheimer that Strauss believed a simple resignation was the better course to follow, but Strauss stopped short of making an outright recommendation. Sensitive to possible future accusations that he and Nichols had used "star chamber" tactics on Oppenheimer, Strauss was careful not to force Oppenheimer into any prescribed course of action. At first reflection Oppenheimer was inclined to offer his resignation, a move which might have ended the matter then and there. But the more he thought about the specter of the Jenner committee investigation, the more he became troubled by
the prospect of resigning his consultantship prior to the putative investigation by the congressional committee. To quit without a fuss, as Strauss plainly wanted him to do, would also be interpreted as evidence of guilt whenever the President's order and the Commission's unsigned charges were brought to light, as they surely would be.

When Oppenheimer asked how much time he had to think the matter over, Strauss replied that since implementation of the President's order had already been delayed nearly three weeks, he could only give the scientist until the next day to make up his mind. Nevertheless, Oppenheimer thanked Strauss for his consideration and indicated he would consult with Marks. Desiring to study the statement of charges carefully with his lawyer before coming to a decision, Oppenheimer asked if he could take a copy of the Nichols' letter with him. Strauss refused the request on the grounds that it would be unwise to circulate the unsigned letter, but promised to dispatch the statement of charges immediately should Oppenheimer choose to go through the normal hearing procedure rather than request termination of his contract.

Oppenheimer apparently had had no intimation of the government's proposed action before he walked into Strauss' office and the shock of his experience was evident as he rose to leave. He regretted, the scientist remarked to Strauss, that he had to sever his relationship with the government under either

alternative, but he understood that under the circumstances the Commission had little recourse but to offer him the two painful choices. As Oppenheimer prepared to leave, Strauss told him about Marks' visit earlier that morning. When Oppenheimer indicated he would like to contact Marks immediately, Strauss lent the scientist his car so that he could drive directly to Marks' office. It was 3:35 p.m. The entire meeting had lasted only slightly more than half an hour.[20]

That evening Oppenheimer met briefly with Marks and with another friend and former general counsel, Joseph A. Volpe, Jr., before returning to Princeton by train. Shortly after noon the next day Nichols called Oppenheimer in Princeton to ask whether he had reached a decision. Oppenheimer had not had time to recover from the blow of the previous day's meeting, much less give very much thought to the decision, but Nichols insisted upon an answer that afternoon. Under this pressure Oppenheimer decided to return at once to Washington, and he spent the evening in Volpe's office discussing the strategy of a reply. Volpe, who was experienced in the ways of the bureaucracy, urged Oppenheimer to seek an accommodation with the Commission: Oppenheimer would quit if the Commission accepted his resignation without prejudice, i.e., on the basis that his services were no longer needed, without mentioning the security aspect. But cold reflection reminded them that neither the Borden letter nor the Commission's statement of charges would disappear. From Oppenheimer's point of view, it was one thing to resign under pressure when one's services were no longer wanted or needed, but quite another to be forced out by the security system, sacrificing both integrity and honor while leaving the charges unchallenged. He decided to accept the Commission's statement of charges with all the risks and uncertainties it entailed.[21]

Even before Oppenheimer accepted the statement of charges, Strauss inquired whether the FBI could set up a "full-time surveillance" of Oppenheimer, which would have required agents to monitor Oppenheimer's every movement and contact around the clock. Hoover objected that such an operation would be too costly in manpower and money, but he did order the FBI office in Newark, New Jersey, to maintain a "spot check" on Oppenheimer. This meant assigning two agents to follow Oppenheimer and members of his family when they left his residence and to observe visitors. Hoover also authorized taps on Oppenheimer's home and office telephones, which were installed on January 1, 1954. The Newark office reported that the taps made the spot check much more efficient than it would have been otherwise and permitted the FBI to plan surveillance operations when Oppenheimer indicated that he planned travel outside the Princeton area. Thus, after January 1 the only privacy accorded Oppenheimer by the FBI were conversations within his own home.[22]

A STRATEGY FOR DEFENSE

Buoyed up and encouraged by his friends, Oppenheimer set about after the New Year to obtain competent legal assistance in his confrontation with the Commission. Far from complacent about his situation, Oppenheimer would have been even more concerned had he known that Strauss, Nichols, and Mitchell were privy to his every move in selecting counsel. When the FBI agent in Newark first began to pick up conversations about legal matters, he called his supervisors in Washington to ask whether the tap should be continued "in view of the fact that it might disclose attorney-client relations." He was assured that the tap was appropriate because Oppenheimer was involved only in a security case and not a criminal action. The FBI's chief concern, the agent was informed, was to learn immediately of any indication that Oppenheimer was planning to flee the country. Under the circumstances the surveillance was "warranted." Strauss in

turn reassured Bates that the surveillance was "most helpful" to the Commission in that "they were aware beforehand of the moves he [Oppenheimer] was contemplating." Strauss confided to both Bates and Mitchell that the importance of the case "could not be stressed too much." If the Commission lost the case against Oppenheimer, Strauss thought that the atomic energy program would fall into the hands of "left-wingers" and the scientists would take over the whole program. Strauss warned that if Oppenheimer were cleared, then "anyone" could be cleared regardless of the information against them.[23]

The FBI office in Newark provided Strauss and Mitchell with almost daily reports on Oppenheimer's efforts to find counsel. Volpe advised Oppenheimer to find a tough trial lawyer experienced in the rough and tumble of courtroom cross-examination; but selection of appropriate, able, and available counsel on short notice was a difficult task. It took Oppenheimer almost two weeks, with Marks' help, to assemble his legal staff. His chief counsel would be Lloyd K. Garrison, a New York attorney whom Oppenheimer knew as a member of the board of trustees of the Institute For Advanced Study. Garrison offered Oppenheimer legal distinction well-matched to the physicist's scientific reputation. Like Oppenheimer, Garrison was also drawn to liberal causes and had served as president of the National Urban League and as a member of the American Civil Liberties Union. Described as "Lincolnesque in appearance" and "mild of manner," Garrison seemed an excellent complement to Oppenheimer, both temperamentally and intellectually. Assisting Garrison were Marks and Samuel J. Silverman, an attorney in Garrison's law firm.[24]

Shortly after accepting the assignment as Oppenheimer's chief counsel, Garrison realized that he would need a security clearance. Not only would Oppenheimer's FBI files and materials relating to the hydrogen bomb be denied him without a clearance, but Garrison feared he could not even talk freely with his client without compromising classified information. Garrison's application for clearance for himself, Marks, and Silverman gave Nichols some concern. Although the FBI had no substantially derogatory information on Silverman or Garrison, there had been several allegations going back many years against Marks. Much of the material in Marks' file was hearsay, vicious, and unverified, but it seemed serious enough to preclude a quick reinstatement of Marks' clearance without a full background investigation. There was a real danger that the Commission might become involved in a personnel security hearing for Marks as well as Oppenheimer.[25]

Trying to be as diplomatic as possible, Nichols suggested limiting clearance to Garrison alone on the grounds that one clearance would be sufficient for handling Oppenheimer's case. After considering the question for several days, Garrison decided that he would not ask for a clearance for himself or his associates, but would present the case as best he could on the basis of unclassified evidence. Nichols had no choice but to accept Garrison's decision, but he told Garrison he had made a serious mistake. Nichols assured Garrison that he would try to declassify all documents relevant to the case, but Garrison's decision left him standing with Oppenheimer outside Eisenhower's "blank wall" of security.[26]

During the third week of January 1954, Garrison and others explored with Nichols and Strauss a variety of procedures that might have avoided a formal hearing. In every case Strauss was careful not to appear to be forcing Oppenheimer's hand, but with good reason he could not promise that the proposed alternatives would save Oppenheimer from later embarrassment.[27] In fact, when Garrison and his colleagues had thought better of their own suggestions, Strauss offered Garrison an idea of his own. It was always possible for Oppenheimer, as it would be for any respondent, to terminate his contract, thus removing the

"need to know" and making further proceedings unnecessary. In this connection, if the Commission had Oppenheimer's letter of resignation in hand, Strauss would try to reinstate the scientist's clearance temporarily before the resignation was accepted, and against his better judgment, withdraw the letter of charges before accepting the resignation. Again Strauss could offer no absolute guarantees, especially against congressional hearings or publicity attendant to the case, but his solution would have allowed Oppenheimer to save some face, avoid a hearing, and minimize the impact of his troubles on the Commission's program.

Given the pendency of the hearings, Garrison doubted whether it would be possible for Oppenheimer to tender his resignation without appearing to concede the substance of the charges, even if they were withdrawn. Marks suggested that Oppenheimer's clearance could be reinstated and the proceedings dropped, allowing the physicist's contract to expire on June 30, 1954; but in view of the President's orders it was not possible for the Commission to do this. As they parted, the lawyers indicated they would discuss the matter with Oppenheimer while Strauss reported the negotiations to the full Commission. At the end of the day, Garrison and Marks returned to report bad news; they had spent the afternoon discussing alternatives with Oppenheimer, and the scientist had decided it was necessary to go through with the hearing.[28] The negotiations having failed, both sides had no choice but to continue their preparations for a hearing.

THE SECURITY BOARD

Because the Washington headquarters did not have a regularly constituted personnel security board as did the Commission's operations offices, it was necessary either to bring in a board from the field or to appoint an ad hoc board for the sole purpose of judging the evidence against Oppenheimer. It was also apparent to Commission officials that should Oppenheimer demand a hearing, no ordinary panel would be competent to review the case. Thus, after conducting an exhaustive field survey, General Counsel Mitchell recommended the latter alternative. The Commission should recruit a board of tough but honest men who were Oppenheimer's peers, Mitchell suggested. If possible the board should be composed of a lawyer, a university scientist, and an individual with a national reputation in private life. It was also desirable, Mitchell noted, to have at least one Republican and one Democrat on the board.[29]

Gordon Gray was the Commission's choice to head the board. From a wealthy and prominent North Carolina family, Gray brought to the board a stature which easily matched Oppenheimer's. A graduate of Yale Law School, Gray had practiced law in New York, become a publisher in North Carolina, and had been active in state politics. After serving in the Army during World War II, he became Assistant Secretary of the Army in 1947 and had served as a presidential assistant until he was elected president of the University of North Carolina in 1950.

Gray was the only member of the board to be recruited personally by Strauss. The staff recommended the second member, Ward V. Evans, a professor of chemistry at Loyola University in Chicago. Evans had earned a reputation as a conscientious member of security review boards appointed by the Chicago operations office. He scarcely matched Oppenheimer in scientific reputation but he was a respected teacher.

To balance Evans, who was a conservative Republican, the Commission hoped to find another Democrat so that the board would not seem to be stacked against Oppenheimer. After at least four candidates refused the position, Mitchell secured the consent of industrialist Thomas A. Morgan of New York. The son of a

North Carolina farmer, Morgan had worked his way up through the trades to become a technician in the Navy during World War I. His ability to repair gyrocompasses earned him a position with the Sperry Gyroscope Company after the war and he became president of the company in 1933 at the age of 46. In 1949 he had served in the Truman Administration as an advisor on management improvement.[30] Neither Oppenheimer nor Garrison expressed any dissatisfaction with the Commission's choices for the board.

The selection of Roger Robb as counsel for the board, however, was to be one of the Commission's most controversial decisions. First of all the selection of an attorney from outside the general counsel's staff to assist the board in a personnel security matter was unprecedented, and represented another clear departure from the Commission's normal procedures. But that fact alone would not have raised questions were it not for Robb's perception of his task. In contrast to Garrison, whose experiences in labor arbitration had taught him the arts of compromise and conciliation, Robb had earned distinction as a prosecutor during his seven years as Assistant United States Attorney in Washington between 1931 and 1938. Thereafter in private practice he developed a local reputation for being a combative and resourceful trial lawyer.

Like Gray, Robb was first approached personally by Strauss. When the Commission decided to seek outside assistance in the Oppenheimer case, Strauss obtained Robb's name from William P. Rogers, the deputy attorney general. Robb's selection as the personnel security board's counsel was later interpreted as evidence of Strauss' determination to "get Oppenheimer." It was Strauss, Stewart and Joseph Alsop charged, "who had the final responsibility for the curious decision that the AEC counsel should be Roger Robb, a man best known as the lawyer for Senator Joseph R. McCarthy's chief journalistic incense-swinger, Fulton Lewis, Jr."[31] Although there was no evidence that Robb was Strauss' or the administration's hand-picked hatchet man, the fact that Robb was employed for his trial skills was evident even to Robb himself. Thus Robb's subsequent handling of the Oppenheimer case before the Gray board helped create the suspicion that he had been specifically chosen to carry out Strauss' alleged vendetta against the scientist.[32]

PREPARING FOR THE HEARINGS

Garrison's decision to present the defense on an unclassified basis by foregoing a security clearance for himself meant that he could inspect none of the classified material in Oppenheimer's file. Garrison and Marks requested the Commission to declassify certain documents entirely. These included 1946 FBI reports containing derogatory information about Oppenheimer, letters from leaders of the Manhattan project, and specific Commission records on Oppenheimer's 1947 clearance and his views on the hydrogen bomb. Nichols informed Garrison that Oppenheimer could read any classified document which Oppenheimer himself had signed. If Oppenheimer came to Washington for that purpose, Nichols promised to make the documents available to him in the general manager's office. Although there were no verbatim minutes of the Commission's action in 1947, Mitchell was willing to stipulate for purposes of the Gray board hearings that "on August 6, 1947, the Commission recorded clearance of Dr. J. Robert Oppenheimer, which it noted had been authorized in February 1947."[33] Beyond that, Nichols reported, the Commission was unable to go.

Garrison's disadvantage was obvious but far greater than even he suspected. The FBI had not only provided the Commission with investigative reports relative to the Borden letter and Nichols' statement of charges, but between December 22, 1953, and April 12, 1954, the first day of the Gray board hearings, the FBI sent the Commission more than 110 reports concerning Oppenheimer, of which more than

fifty were transmitted as personal letters from Hoover to Strauss.[34] Hoover was careful not to reveal the source of his information but it was evident even from his letters that the FBI had bugged or wiretapped Oppenheimer's home and office, or had successfully secured an informant among Oppenheimer's inner circle of friends and associates. As a consequence, the Commission knew of the defense lawyers' plans and strategy, their discussions with potential witnesses for Oppenheimer, and their conferences with their client, as well as Oppenheimer's other business, both personal and mundane.[35]

It is difficult to assess the influence of Hoover's communiques on the outcome of the Oppenheimer case. It is not known when Hoover's letters to Strauss were added to Oppenheimer's official file. If they were placed in the file before the hearing, or were added during the hearing, the Gray board would have had access to them. If not, possibly the Gray board did not know of their existence. Robb probably knew about them and Nichols certainly did, as perhaps did Murray, who boasted that he received everything from Hoover that Strauss did.

If the Hoover letters accomplished nothing else, they allowed the Commission to follow the progress of Oppenheimer's preparations. During February Hoover reported in detail Oppenheimer's telephone conservations with his brother, the activities of Garrison and Marks, a private discussion with Robert Cutler, administrative assistant to the President, and conversations of Oppenheimer's wife at social events. Even more important for Robb were Hoover's reports on Oppenheimer's strategy and the reasons behind his selection of defense witnesses.[36]

On February 4, 1954, Robb settled down to study the Oppenheimer file and plan his presentation to the personnel security board. Strauss and Mitchell had explained that the hearing would not be a trial, but Robb realized that the proceedings would have many of the elements of a trial and prepared his case accordingly. Working steadily between eight and ten hours a day, Robb plowed through Oppenheimer's thick Manhattan District file, which at the time was in the possession of the FBI. Although he had known virtually nothing about Oppenheimer when he accepted the assignment, Robb quickly assumed command of the case.

To begin with, Robb discovered that he worked most easily with C. Arthur Rolander, Jr., his chief assistant from the division of security, Charles Bates of the FBI, and Bryan LaPlante and David Teeple, special assistants to Chairman Strauss. Teeple was especially helpful in providing Robb concise personality profiles of all the major characters involved on both sides. Bates not only provided liaison with the FBI but suggested new aspects of the case. For the most part, however, because the matter was held in such strict secrecy, Robb and Rolander worked on the case alone.[37]

Robb's task was made difficult by the magnitude of Oppenheimer's file, but he had help from other sources. Corbin Allardice, Borden's successor as executive director of the Joint Committee, offered Robb and Rolander important assistance by providing copies of relevant documents which the FBI had culled from the committee's files. Allardice also suggested that Robb interview Borden and Teller, and gave Robb a transcript of an interview in May 1950 with Teller, who deplored Oppenheimer's impact on the project. The FBI provided Robb and Rolander with the greatest volume of information on Oppenheimer, going back to the contents of the trash from Oppenheimer's residence at Los Alamos during World War II. Since many of these sources could not be compromised by agreement with the FBI, much of the file was withheld from Oppenheimer and his attorneys, but not from Robb, Rolander, the Gray board, Nichols, and the Commissioners, who were to decide Oppenheimer's fate.[38]

By prior agreement with the FBI, Robb and Rolander agreed not to interview persons outside the Commission who had already been interviewed by the FBI; they would rely upon Bates to furnish transcripts from the FBI files. Robb insisted, however, on the right to interview employees and consultants, including scientists such as Teller, Ernest O. Lawrence, and Luis W. Alvarez, even if they had recently talked to the FBI. The only exception to this rule was Borden, who was neither an employee nor a Commission consultant when he was interviewed by Robb and Rolander on February 20, 1954. Borden expressed his opinion that "in terms of his capacity to compromise information" no other scientist was potentially more dangerous than Oppenheimer. After three and a half hours of telling Robb and Rolander all he knew about the subject, Borden offered the investigators a list of twenty-eight individuals who would be able to furnish additional information concerning Oppenheimer's influence on the atomic energy program.[39]

John Lansdale, Jr., and Boris T. Pash, both Army security officers during the war, and General Groves freely discussed Oppenheimer's wartime security status, offering the same opinions in private or in sworn testimony before the Gray board. Unfortunately, some of the academic scientists, such as Wendell M. Latimer, a professor of chemistry at the University of California, were not so consistent. Accustomed to speaking openly and freely about associates in offices, laboratories, and closed faculty meetings, but circumspect and correct when it came to discussing professional colleagues in public, Oppenheimer's academic critics, with the exception of Teller, compiled a poor record of candor during the Gray board proceedings. Teller was fearful that the proceedings might develop into a fight which could have adverse effects on the nuclear program. Nevertheless, he insisted that any information supplied by him to the Commission or the FBI and used in the hearing be identified with his name and not as having been furnished by an unidentified informant.[40] Others were not so insistent.

Although Ernest Lawrence did not appear before the Gray board to testify in person, his interview with Robb and Rolander was placed in the record beyond the reach of Garrison's cross-examination. After relating the oft-told story of his own efforts to accelerate the development of the hydrogen bomb in the fall of 1949, Lawrence concluded that Oppenheimer was largely responsible for the growing resistance to the project. Even worse in Lawrence's opinion were Oppenheimer's attempts to wreck research projects on new weapons. He concluded that Oppenheimer had become so arrogant and had been guilty of so much bad judgment that "he should never again have anything to do with the forming of policy."[41]

MCCARTHY AND THE PRESS

Late in January 1954 James Reston of the New York Times received information "from a reliable source" that the Commission had started proceedings against Oppenheimer. Unable to obtain any confirmation from either Oppenheimer or Strauss, Reston attempted to persuade both sides to release the story by playing on their mutual fears that Senator McCarthy might seize the Oppenheimer issue. Reston was in a strong position because both sides would have preferred to release the story through the relatively responsible New York Times rather than gamble on the unpredictable effects of a McCarthy disclosure. Reston told Oppenheimer that the Times would print the story eventually, but he promised to withhold publication as long as possible.

The Reston threat was bound to exacerbate suspicions on both sides that the other party was attempting to play politics with the case through the newspapers. The initial reaction in both camps, however, was to join forces to

keep Reston quiet. To prepare for the inevitable, the Commission prepared a press release on January 29, 1954, and authorized Mitchell to alert Garrison to Reston's intentions. Garrison acknowledged that Reston had approached Oppenheimer. Whether or not Garrison reciprocated Mitchell's action in reading the Commission's proposed press release over the telephone, the Commission soon had a copy of Oppenheimer's proposed statement from J. Edgar Hoover.[42] During February Garrison continued to pursue with Strauss and Nichols what sort of response the Commission would make to press inquiries.

As the Army-McCarthy feud moved toward its climax, Garrison became more worried that Oppenheimer might become McCarthy's next target. Garrison knew that McCarthy had already come across Oppenheimer's name in another investigation. Until he received Reston's warning, however, Garrison considered an investigation by the Jenner committee the greater threat. It seemed likely that the Joint Committee would rise to any challenge to its own prerogatives from Jenner, but Garrison could get no assurances from Strauss that the Commission would back the committee in such a position.[43]

The situation became even more dangerous on March 31 when Strauss, just back from the Pacific weapon tests, announced that the United States had developed a hydrogen bomb which could destroy an entire city. McCarthy, who had obtained time on Edward R. Murrow's television program to reply to the newsman's attack upon his investigating methods, used the occasion to launch an unexpected blast at the Commission's thermonuclear program. McCarthy charged that there had been an eighteen-month delay in the project as a result of foot-dragging by communist sympathizers.[44]

The charge suggested to those in the atomic energy establishment that McCarthy had obtained access to Borden's chronology. For Garrison, who knew nothing of Borden's paper, the charge came dangerously close to Oppenheimer. Whether McCarthy had any solid information or was merely lashing out against his enemies, the attack did come just three days before the formal hearings were to begin on April 12. It was not likely that the Oppenheimer case could be kept secret much longer.

From the FBI, Strauss learned that Oppenheimer was now discussing the possibility of a news release with both the Alsop brothers and Reston. The Alsops were indignant to learn of Oppenheimer's difficulties and were determined to write an essay exposing the government's duplicity in "persecuting" Oppenheimer. Perhaps frightened by the Alsops' enthusiasm, Oppenheimer seemed to prefer working with Reston, who suggested that Garrison give him, in strictest confidence, a copy of the statement of charges and Oppenheimer's reply. Reston was to prepare a story and hold it until it could no longer be kept secret. Garrison appreciated Reston's forbearance as well as the value of having the story first break in an accurate article by a newsman of Reston's stature. But Garrison also knew that subsequent articles in other papers were not likely to tell the full story and these might damage Oppenheimer's case. Garrison was also reluctant to break his news embargo agreement with the Commission and did not want to offend the members of the Gray board before the hearings began.[45]

At the same time both the White House and the Commission were wary of McCarthy's exploitation of the Oppenheimer case. In a White House meeting on April 9, 1954, Strauss told Sherman Adams and others that he had learned from the Times' publisher that the editorial board had voted not to publish Reston's story until the news broke elsewhere. Strauss had expressed his gratitude and had promised to alert the Times if he learned that anyone else was about to use the story. James C. Hagerty, the President's press secretary, feared that the Eisenhower Administration might get caught in the cross-fire of a fight between

McCarthy and Oppenheimer as each tried to use the White House to his own advantage. To avoid that danger, Hagerty suggested that Strauss withdraw his commitment to alert the Times. Then, Hagerty reasoned, the Times would run the Reston story using Garrison's documents. In so doing, the Times would undercut McCarthy and make it unnecessary for the White House to leak the story. Hagerty then assisted Strauss in drafting a press release which would be issued "on the spot" when the story finally broke. In reviewing the draft release on April 10, Eisenhower stressed the importance of sticking to the facts in the Oppenheimer case so that the government could assure "orderly procedure." "We've got to handle this so that all our scientists are not made out to be Reds," the President warned, because "that Goddamn McCarthy is just likely to try such a thing."[46]

As a final effort to neutralize McCarthy, Hagerty sought the senator's pledge to keep silent on the Oppenheimer matter for security reasons. When Hagerty learned that Vice President Nixon had supposedly extracted such a promise from McCarthy, he suggested that Strauss, Everett M. Dirksen, the Senate majority leader, or perhaps even Nixon himself, should remind McCarthy of the need to respect his previous commitments. Later that same day Strauss tried to reassure a still unconvinced Hagerty that McCarthy had been silenced. Everything seemed to be under control for the opening of the Gray board hearings on Monday morning, April 12.

THE GRAY BOARD CONVENES

During the week of anxiety at the White House and the Commission over the possibility that McCarthy might capitalize on the Oppenheimer case, the personnel security board began its review of the scientist's clearance file. On the morning of April 5, 1954, Gray, Morgan, and Evans gathered in their makeshift headquarters for a briefing on security criteria and procedures. Thereafter, with Robb and Rolander close at hand to answer questions or provide technical assistance, they worked meticulously through the file. Throughout the week they remained as anonymous as possible, avoiding the public and eating together at lunch and dinner, where they were often joined by Robb. Not surprisingly, they soon enjoyed a close and personal rapport.[47]

At the outset Morgan reported a profoundly disturbing incident which had occurred just before he left New York. On March 30 he had been approached by Trevor Gardner, a special assistant to the Secretary of the Air Force for research and development, who told Morgan he knew all about the forthcoming hearing. Gardner related that many of the nation's leading scientists were deeply concerned about the government's actions, and he warned that great damage could be done to American scientific morale and defense efforts should Oppenheimer's clearance not be reinstated. Gardner also cautioned Morgan that in addition to Reston and the Alsops, McCarthy had the story and might use it to everyone's detriment. Morgan, who misunderstood neither Gardner's intentions nor his veiled threats, reported the contact to Gray, who passed the information on to Strauss. Strauss, in turn, informed the President and the Secretary of Defense.[48]

The impact of the Gardner incident on the Oppenheimer case was subtle. Mitchell assured Morgan he could dismiss the matter from his mind, secure in the knowledge that the government had matters well in hand. But the incident, which had involved a serious leak of classified information, left a residue of suspicion with Gray and Morgan on the eve of the hearings. At a minimum they were distressed by the improper advances made on Oppenheimer's behalf. More seriously, perhaps, the incident provided first-hand evidence that Oppenheimer and his friends disregarded the ordinary constraints of the security system and

intimidated opponents and critics. By the end of the week, Gray was no longer passively analyzing Oppenheimer's file, but was contributing derogatory evidence which he had heard about the scientist.[49]

Gray's suspicions of Oppenheimer and his friends significantly increased following the publication of Reston's story on the second day of the hearing. Apparently ignorant of Hagerty's strategy to force publication in the New York Times, Gray had accepted Garrison's pledge that he would do everything possible to keep the story out of the press. Unfortunately, Garrison did not tell Gray that he had already given Reston copies of the statement of charges and Oppenheimer's reply. Thus, when the Times accompanied its story with full texts of these documents, it was painfully clear to Gray that Garrison had been less than candid with the board. No one at the Commission seriously questioned Oppenheimer's right to release the charges, and even Gray did not regard the publication a breach of security. Nevertheless, given Garrison's prior assurances of confidentiality, the episode provided the Gray board still another example of how Oppenheimer and his associates placed their personal judgment above the "rules" by which everyone else had agreed to be governed. Inexcusably, no one at the White House or at the Commission had bothered to tell Gray that the "rules" had been changed.[50]

After weeks of preparation the hearings began on Monday morning, April 12. Perhaps to avoid reporters, perhaps because of the shortage of space in the Commission's headquarters building, Gray convened the hearings in a converted office on the second floor of a dilapidated temporary building which the Commission occupied on Constitution Avenue, near the Washington Monument. In accordance with Commission practice, the security hearing was closed and attendance strictly limited. The only Commission personnel were the three members of the board, Robb, Rolander, a classification officer, a court reporter, and a transcriber. With Oppenheimer and his wife were Garrison and his legal associates -- Silverman, Allen B. Ecker, and sometimes Marks. Before this group appeared a steady stream of forty witnesses, including Oppenheimer. The list of witnesses included prominent government officials who had known Oppenheimer during and after World War II, two former Commission chairmen and three former Commissioners, several members of the general advisory committee, Nobel laureates, some of Oppenheimer's academic colleagues at Berkeley, leaders of the American scientific community, and former Army security officers. Beginning at nine-thirty each morning, the sessions lasted with few exceptions until well after five, usually for five days each week over a period of four weeks.

Gray opened the first session by reading the statement of charges and Oppenheimer's autobiographical reply.[51] In his moving response, Oppenheimer admitted all but three of Nichols' allegations. He was, by his own admission to the board, a fellow traveler, whose brother Frank, sister-in-law Jacquenette, fiancee Jean Tatlock, and wife Katherine had all been members of the Communist Party. Oppenheimer's confession, however, was hardly startling or incriminating. Army and Commission officials had known about the uncontested derogatory information for years and twice, in 1942 and 1947, had passed favorably on Oppenheimer's clearance despite the record. In fact Gray was deeply troubled that most of the allegations placed Oppenheimer in double jeopardy, contrary to the American system of justice.[52]

Ironically the members of the board were much more concerned about the three allegations Oppenheimer denied: that he had attended a Communist meeting in his home in 1941; that he had obstructed progress on the thermonuclear weapon; and that he had lied about contacts with Soviet agents. Thousands of words and many weeks later, the board's deliberations would focus on the second

and third of these allegations and in the end they were in fact to determine Oppenheimer's fate, whatever public reasons the board and the Commission might give.

ALLEGATIONS: THE CROUCH INCIDENT

Of the first controverted allegation, the Commission and the FBI had known for more than a year that the so-called "Crouch incident" could not be substantiated. In May 1950 Paul Crouch and his wife had testified before the California committee on un-American activities that they had attended a Communist party meeting at Oppenheimer's Berkeley residence. Now before the Gray board, Oppenheimer explained what Gordon Dean had long known: Oppenheimer could not have attended such a meeting because he was on vacation with his wife in New Mexico at the time, a fact that was confirmed by their guest, Hans Bethe.[53]

ALLEGATIONS: THE HYDROGEN BOMB

The second controverted charge, which contended that Oppenheimer had obstructed the development of the hydrogen bomb, was at the same time a central issue in the minds of Oppenheimer's critics and one of the most difficult allegations to substantiate. Aside from noting Oppenheimer's well known reservations about the hydrogen weapon, Nichols cited only two specific incidents of alleged obstruction. The first was that Oppenheimer had sent reports to Los Alamos about the meeting in October 1949 of the general advisory committee, which had recommended against accelerating thermonuclear development. The second was that he had discouraged other scientists (unnamed in the charges) from participating in the project. On the first charge, the Gray board easily determined that the reports in question were not circulated by Oppenheimer, but rather had been sent to Los Alamos at the request of the Commission's general manager in preparation for a Congressional visit.[54] But even with this minor charge refuted, the larger question remained: Had Oppenheimer's opposition to the thermonuclear program jeopardized the security of the United States?

Evidence presented to the Gray board established that Oppenheimer had opposed the hydrogen bomb in 1949 on moral and technical grounds, but there was little to indicate that he had obstructed the development of the weapon after Truman had authorized it. Major General Roscoe C. Wilson and David T. Griggs, testifying for the Air Force, recalled Secretary Thomas K. Finletter's suspicious reaction to Oppenheimer's preference for tactical atomic bombs over thermonuclear weapons. Furthermore, there was a belief within the Air Force, Griggs reported, that Oppenheimer led a group of scientists determined to clip the wings of the Strategic Air Command by advocating deployment of tactical weapons in Europe and the establishment of continental air defense in North America.[55]

Although the plot against the Strategic Air Command could not be proven, Air Force officials had found some of their misgivings reinforced in April 1952, when Alvarez shared with Finletter and others his recollections of Oppenheimer's left-wing activities during the pre-war period at Berkeley. Alvarez had learned, however, that this information was already in FBI files. As was often true in the Oppenheimer affair, the only "new" information Alvarez could offer concerned Oppenheimer's apparent duplicity on thermonuclear matters.[56]

Despite their suspicions, it was difficult for Oppenheimer's critics, whether in 1952 during the fight for the second weapon laboratory, or in 1954 before the Gray board, to demonstrate conclusively that he actually impeded the thermonuclear project. It proved impossible to link his evident lack of enthusiasm for the hydrogen bomb with their suspicions of Oppenheimer's

disloyalty. In April 1952, when Alvarez saw Finletter, the FBI was also questioning four other nuclear scientists about Oppenheimer's attitude toward the hydrogen bomb. Of the four, only one, who requested anonymity, openly expressed his doubts about Oppenheimer's loyalty.[57] On the other hand, Hans Bethe, one of the scientists Oppenheimer supposedly discouraged, denied that his friend had ever tried to influence him not to work on the hydrogen bomb, although he had agreed in principle with Oppenheimer that the weapon should not be developed.[58]

In the final analysis, the significance of the hydrogen bomb charges brought against Oppenheimer must be measured against their ultimate source, Edward Teller. To Robb, Teller conceded that he did not know what motivated Oppenheimer to oppose the thermonuclear program, nor could he prove that Oppenheimer had not acted in good faith. Teller believed, however, that Oppenheimer had given a good deal of "harmful" advice so as deliberately to impede the project. Skirting the assessment of Oppenheimer's loyalty, Teller speculated that Oppenheimer, not wanting to see his achievements surpassed, might have become a victim of his own vanity. Whatever the reason, Teller thought Oppenheimer should never again have influence over the American thermonuclear program although he hoped Oppenheimer's clearance would not be revoked "for a mere mistake of judgment."[59]

When Teller arrived in Washington to testify he was depressed and troubled, as Strauss no doubt noticed during a private visit just before the hearing. To counteract Teller's doubts and to prepare him as an effective "rebuttal" witness, Robb provided Teller with excerpts from the hearings and a digest of materials from Oppenheimer's security file. The tactic worked when Teller, only vaguely aware of Oppenheimer's left-wing background, shared the alarm of those who read Oppenheimer's file for the first time. Furthermore, in one instance, he identified testimony which was at variance with his recollection of an earlier conversation with Oppenheimer. Teller seemed to think that Oppenheimer was up to his old tricks, and Robb did nothing to disabuse Teller of this assumption.

On the witness stand, Teller offered substantially the same testimony he had earlier given Robb and the FBI. When Robb inquired about Oppenheimer's loyalty, Teller replied unequivocally, "I have always assumed, and I now assume that he is loyal to the United States." But to Robb's question whether he believed Oppenheimer was a security risk, Teller answered:

> "In a great number of cases I have seen Dr. Oppenheimer act -- I understand that Dr. Oppenheimer acted -- in a way which for me was exceedingly hard to understand. I thoroughly disagreed with him in numerous issues and his actions frankly appeared to me confused and complicated. To this extent I feel that I would like to see the vital interests of this country in hands which I understand better, and therefore trust more.
>
> "In this very limited sense I would like to express a feeling that I would feel personally more secure if public matters would rest in other hands."[60]

Afterwards Teller realized he had virtually condemned Oppenheimer for his opinions and advice. Trying to clarify his thinking for Gray, Teller speculated that Oppenheimer would not knowingly or willingly endanger the safety of the United States. To that extent, he advised, there was no reason to deny clearance. But in contradiction to his earlier statement to Robb, Teller continued, "If it is a question of wisdom and judgment, as demonstrated by actions since 1945, then I would say one would be wiser not to grant clearance."

Understandably, Teller admitted he was a "little bit confused on this issue, particularly as it refers to a person of Oppenheimer's prestige and influence."[61] Nevertheless, he successfully summed up the substance of the hydrogen bomb charges against Oppenheimer which Green had drawn from Teller's FBI interview.

ALLEGATIONS: THE CHEVALIER AFFAIR

The third controverted allegation related to the well-known Chevalier incident. This allegation was disputed, not because there was any doubt that the incident had taken place, but rather because there was uncertainty about the facts of the case and the significance of subsequent meetings between Oppenheimer and Haakon Chevalier at Princeton in 1950 and in Paris in 1953. Although the Chevalier incident stood as the single most important issue raised by the statement of charges, the facts of the matter have never been fully disclosed, nor has the importance of this single incident in bringing about Oppenheimer's ultimate downfall been fully understood.

Sometime in 1942 when Russian armies were battling for their very existence, Peter Ivanov, secretary to the consulate-general of the Soviet Union in San Francisco, asked George C. Eltenton, a British citizen employed by the Shell Development Corporation, to assist the Russians in obtaining information concerning the secret atomic research conducted at the University of California Radiation Laboratory. Ivanov suggested that Eltenton might contact either Lawrence, Oppenheimer, or perhaps Alvarez.[62] Later in 1946, when interviewed by the FBI, Eltenton was not certain that the third scientist was Alvarez, although that was his best recollection. In fact, Alvarez was not at Berkeley at the time, but Ivanov may not have known this. Of the three, Eltenton knew only Oppenheimer slightly, but not enough to approach him. Instead, he suggested that Chevalier, a Berkeley professor known to be a close friend of Oppenheimer's, might serve as contact with the scientists. Subsequently, Eltenton approached Chevalier with the same request on the grounds that the Soviet armies needed the information in their struggle against the Nazis. Chevalier was uneasy about Eltenton's request, but he agreed to keep the matter confidential even from his wife.[63]

Later Oppenheimer invited the Chevaliers to dinner. While both men were in the kitchen mixing drinks, Chevalier casually mentioned his conversation with Eltenton. It is uncertain whether Chevalier merely reported his meeting with Eltenton or mentioned details of the scheme, including the proposed contacts with Lawrence and perhaps Alvarez. But Oppenheimer stated in no uncertain terms that the idea was terribly wrong and thereupon Chevalier dropped the subject immediately. Thus, Oppenheimer saw no danger in the incident and, because he was confident Chevalier was no spy, he neglected to report it to security officers at the laboratory. Besides, he was soon swept up in events which demanded his utmost attention. On March 25, 1943, Oppenheimer left California for New Mexico to establish the Los Alamos laboratory.

Having assumed command at Los Alamos, Oppenheimer became more sensitive to security requirements. Concerned now that Eltenton bore watching, he alerted Lieutenant Colonel John Lansdale, Jr., Manhattan project security officer, to the fact that Eltenton had tried to contact scientists on the project. Not surprisingly, the security officers wanted more details, and on August 23, 1943, Oppenheimer was cross-examined about this matter by Lt. Colonel Boris T. Pash, an Army counter-intelligence officer stationed at the Presidio in San Francisco. Unknown to Oppenheimer, the interview was recorded.

Oppenheimer had not anticipated Pash's interrogation, and thus was unprepared for the grilling he received. Pash was particularly interested in

indentifying Eltenton's confederate and the other scientists who might have been approached, but Oppenheimer, wanting to protect himself, Lawrence, and Alvarez, as well as his friend Chevalier, refused to divulge any more names. Again and again Pash probed, but each time Oppenheimer demurred by responding only that approaches had been made to three persons, two of them (presumably Alvarez and himself) located at Los Alamos. Oppenheimer's story, although misleading, was accurate as far as it went. Unfortunately, thereafter, it would become confused and twisted.[64]

Determined to ferret out the truth after additional unsuccessful interviews with Oppenheimer, Lansdale and Pash asked Groves to order Oppenheimer to name the intermediary. Groves eventually complied, but only after a preliminary conversation with Oppenheimer failed to elicit the information voluntarily. Groves thought Oppenheimer was acting like a school boy in protecting his friends, but on December 12, 1943, he learned that Oppenheimer had family concerns as well: apparently Chevalier had also talked to his brother, Frank. As the plot thickened, the truth was irretrievably lost. Had Chevalier actually approached both Oppenheimer brothers, or had he spoken only to Frank, who then turned to his older brother for advice? Was Oppenheimer trying to shoulder the entire burden for his brother and friends? Obviously, a great deal was at stake, including the project. Thus, whatever his motives, Oppenheimer secured Groves' pledge not to report his brother's name to the FBI, thereby incredibly implicating the head of the Manhattan project in his story. Back in Washington, Groves wondered whether he was bound by his promise to Oppenheimer. Advised by his aides that he had a higher obligation to national security, Groves nevertheless omitted Frank Oppenheimer's name from the dispatches alerting the field officers to the chain leading from Eltenton to the nuclear scientists.[65]

There, for the moment, the matter rested. Oppenheimer had been forthcoming in all details of the incident excepting the names of the other scientists, for which he was not pressed. With no immediate threat to the project and with the principals all under surveillance, Groves saw no need to challenge Oppenheimer further. Besides, the FBI and Army security preferred to make no move until an overt act of espionage had been committed. Premature questioning of either Eltenton or Chevalier might not only drive the suspected spy ring further underground but would also confirm for the Russians the key figures in the American atomic bomb project.

In 1946, when the FBI finally interviewed Eltenton, Chevalier, and Oppenheimer, the truth became even more confused. Picked up and questioned simultaneously, Eltenton and Chevalier were cross-checked during their interrogation. At first Chevalier admitted nothing, but ultimately confessed he had been approached by Eltenton. He insisted, however, he had talked to no one besides Oppenheimer, to whom he did not mention Eltenton's name. Eltenton, on the other hand, offered important additional information. He recalled that Ivanov had suggested contact with three scientists: Oppenheimer, Lawrence, and a third whom he could not remember but guessed was Alvarez. After the unsuccessful meeting with Robert Oppenheimer, Eltenton dropped the matter, but did try to help Chevalier to obtain a government position. By then, however, information in Chevalier's security file precluded his employment with the government.[66]

On September 5, 1946, the FBI interviewed Oppenheimer, after Chevalier had warned him of the government's investigation. Believing that his old friend was in trouble for his wartime involvement with Eltenton, Oppenheimer tried to explain to the FBI how he had wanted to warn security officers about Eltenton's spying without identifying his innocent friend. To emphasize the importance of Eltenton's threat, he told the special agents, he had concocted a "complicated

cock-and-bull story" about three scientists whom Eltenton sought to contact. But actually he thought that he had been the only person contacted by Chevalier. He implied that in this matter the FBI need investigate no further. Significantly, no mention was made of Frank Oppenheimer at this time by his brother, Eltenton, Chevalier, or the FBI.[67]

Oppenheimer's repudiation of his "cock-and-bull story" created serious questions concerning his veracity in 1946, and later in 1954, when he offered essentially the same explanation to the Gray board. He did not know, obviously, about Eltenton's identification of the three scientists. But what explained his backing down from the original story, which seems to have been authentic? It is always possible, but unlikely, that Oppenheimer had concocted his original story without knowing how closely it conformed to the actual facts. If this were true, then he had intended to lie in 1943, but attempted to tell the truth in 1946 and after. Alternatively, perceiving his friend's trouble but confident that Chevalier had given the FBI no additional information, he may have changed his story in 1946 to protect the identity of the scientists, and more particularly, that of his brother. Under this scenario, he would have told the truth in 1943, but would have lied to the FBI and the Gray board thereafter. Finally, Oppenheimer may have been trying to tell the truth all along. Like Eltenton, however, he may have forgotten most of the details which Chevalier did not help him reconstruct. In 1943, he was obviously alarmed about the prospects of Soviet espionage, and in a possible allusion to Alvarez' work at MIT, warned Pash that the Russians were interested in all kinds of information, including radar. By 1946, however, it was evident that neither Lawrence nor Alvarez had been tainted by the Chevalier affair, which had never gone beyond Oppenheimer. Thus, whether out of forgetfulness or because he was embarrassed by his exaggerated warning, Oppenheimer may have tried to adjust his 1946 story to fit the facts as he understood them. But once he came to believe he had lied to Pash, his only explanation was that his story had been a "fabrication and tissue of lies." His shame and contrition are apparent throughout the transcript of the hearing.[68] Unquestionably, Oppenheimer's revised explanation would have been more convincing had he avoided social contact with Chevalier after 1943 and had also been forthcoming concerning his brother. As it was, he did neither.

It was perhaps significant that Lansdale recalled but one contact; Oppenheimer was not the only witness subject to forgetfulness about this issue. But Lansdale's recollection was of no assistance because the one person he remembered was Oppenheimer's brother, Frank.[69] Also appearing as a friendly witness, Groves nevertheless testified that he believed Frank Oppenheimer had been one of the links in the chain which Robert had tried to conceal. Understandably, Groves did not reveal fully the substance of Robert Oppenheimer's confession, or the part he had played in keeping Frank Oppenheimer's name from the FBI.[70] Robb did not press Groves or Lansdale for this information, but simply left it in the classified files beyond Garrison's reach.

Additional derogatory evidence, not included in the Nichols letter and not examined here, was developed during the hearings. For the most part, this information dealt with Oppenheimer's associations with suspected left-wingers such as David Bohm, Giovanni Rossi Lomanitz, Bernard Peters, and Rudi Lamert. One item dealt with Oppenheimer's handling of Glenn Seaborg's ambivalent recommendation to the general advisory committee in 1949 concerning the development of the hydrogen bomb. In the belief that fairness to Oppenheimer required that he be confronted with his accuser, Robb subpoenaed Borden towards the end of the hearings. By the time Borden took the witness stand, however, those present at the proceedings were benumbed by over 2,800 pages of testimony.

Except for squabbling over whether Borden should be allowed to read his November 3 letter into the record, Oppenheimer's lawyers did not challenge or ask to cross-examine the person who had instigated the suspension of clearance. After only three more sessions the hearings concluded on May 6, 1954.

THE GRAY BOARD DECISION

On May 27, 1954, the personnel security board, in a 2-1 decision with Gray and Morgan in the majority, recommended against restoring Oppenheimer's security clearance. With most of the allegations uncontested, and only the Crouch incident denied and unproven, the board's principal task was that of evaluating the evidence rather than fact-finding. In that respect, the board found that Oppenheimer was loyal and discreet, but nevertheless a security risk. The board acknowledged that it had received convincing testimony of Oppenheimer's devotion to his country, and volunteered that "Dr. Oppenheimer seems to have had a high degree of discretion reflecting an unusual ability to keep to himself vital secrets." But the board also asserted that in times of peril, the requirements of national security were absolute. Because there were reasonable doubts in their minds concerning Oppenheimer, they could not recommend reinstatement.

Gray and Morgan ultimately outlined four controlling considerations leading them to their conclusion. First, they found that Oppenheimer's "continuing conduct and associations" reflected a serious disregard for the requirements of the security system. Principally, Gray was disturbed by the arrogance with which Oppenheimer placed his own judgment above that of more responsible persons. Gray and Morgan perceived Oppenheimer's arrogance first hand in the Trevor Gardner incident and the news "leaks" to Reston. More particularly, Gray noted his concern about Oppenheimer's behavior in the Chevalier affair and the hydrogen bomb controversy, and his opinions on tactical weapons, nuclear submarines, nuclear-powered aircraft, continental defense, and long-range detection.[71] Oppenheimer's continuing contacts with Chevalier in 1950 and 1953 also reflected a disregard for the need to keep his associations above suspicion. With the exception of Chevalier, however, the hearings and the security file revealed no significant contact between Oppenheimer and his pre-war left-wing associates after 1943. Of course, he had continued to live with his wife and to see his brother and sister-in-law, and once he met Bohm and Lomanitz on a Princeton street corner while on the way to the barbershop. But unless one was willing to read something sinister into these associations, Oppenheimer committed only one indiscretion, by continuing his friendship with Chevalier. No doubt for the board that was serious enough.

The board also found Oppenheimer susceptible to influence which could have serious implications for the security of the United States. This finding, perhaps, was the most ironic of all. More than one witness had attacked Oppenheimer for his Svengali-like influence over friends and subordinates. Instead, Gray and Morgan seized on two isolated incidents as proof of the exact opposite -- that Oppenheimer was unduly susceptible to the influence of others. In 1943, at the insistence of Edward U. Condon, Oppenheimer and Lawrence had unsuccessfully tried to obtain a draft deferment for Lomanitz. Again, supposedly under pressure from Condon, Oppenheimer had publicly modified his criticism of Peters before the House Un-American Activities Committee in 1949. Futhermore, even though he had been openly attacked by Condon in the press, Oppenheimer indicated to the board that he was still willing to support Condon. Apparently the board considered it a sign of weakness that Oppenheimer would vouch for someone who had criticized him personally. Even Gray and Morgan were uncertain whether these inconclusive incidents demonstrated a susceptibility to influence. As a supplement, therefore, they added that the incidents also

reflected bad judgment, a conclusion that clearly raised the question of Oppenheimer's "understanding, acceptance, and enthusiastic support of the security system." Again, Oppenheimer's relations with Reston during the hearings indicated either that he was susceptible to the journalist's influence, or that he used extremely bad judgment. Either way, Oppenheimer's assurances were not to be trusted.

The most unsettling of the board's conclusions related to Oppenheimer's "conduct" in the hydrogen bomb project. In response to Nichols' charges that Oppenheimer had slowed down thermonuclear development, the board found specifically that he had neither circulated the reports in question, nor had discouraged other scientists from working on the project. As to the more general allegation concerning Oppenheimer's opposition, the board found that "because of technical questions involved," it could not make a categorical finding that the project had definitely been delayed. Thus, with the specifications discredited, why did not the charge fall? Rather than dismiss the charge, the board accepted Teller's reasoning and found that Oppenheimer's lack of enthusiasm had delayed the initiation of a concerted effort on the hydrogen bomb. Consequently, whatever the motivation, Oppenheimer had damaged the security interests of the United States. The board's finding, stripped of Teller's qualification, in effect condemned Oppenheimer for his sincerely offered, if incorrect, opinion.[72]

Finally, Gray and Morgan "regretfully concluded" that Oppenheimer had been less than candid in his testimony before the board. As Garrison noted in his brief to the Commission, this subjective finding was perhaps the most difficult of all to refute. It was also the most damaging to Oppenheimer's case. Without access to the classified files, Oppenheimer's lawyers and most subsequent commentators have assumed the board was referring to the scientist's testimony about the meeting of the general advisory committee in October 1949, and other matters relating to the hydrogen bomb controversy. No doubt these matters were in the minds of the board members, but from the board's perspective, a more serious lack of candor was revealed in Oppenheimer's testimony on the Chevalier affair, when he had failed to be forthcoming about his brother. This failure was to become a major factor in Nichols' recommendation to the Commission.

When the hearings were over, Gray believed that the proceedings had been as fair as circumstances allowed. He granted that Oppenheimer and his counsel did not have full access to the documentation in possession of the board, but he did not believe that the deficiency had worked an appreciable disadvantage to Oppenheimer. Gray admitted to some discomfort about Robb's aggressive cross-examinations, and his piecemeal and surprise references "from various documents." But because Oppenheimer's veracity was a major issue, Gray ultimately justified Robb's prosecutorial methods on the grounds that only a vigorous and effective cross-examination could get at the truth.[73] Curiously, Robb had been inexplicably gentle when it came to pressing Oppenheimer, Groves, and Lansdale for the facts concerning Frank Oppenheimer's involvement in the Chevalier affair.

Whatever doubts Gray may have had concerning the fairness of Robb's tactics were laid to rest when Robb volunteered to help Evans write his dissenting opinion. Evans' original pencil draft had alarmed Gray, who was less concerned by the dissent than he was by the prospect that the statement, if filed as written, would reflect unfavorably on Evans, and probably on the work of the board itself. Thus, after completing his work on the majority decision, Robb in turn assisted Evans in preparing his brief. Evans could find no basis for denying Oppenheimer clearance. The charges relating to his left-wing past were old and twice evaluated, those pertaining to the hydrogen bomb controversy

utterly unproven. Evans observed that many of Oppenheimer's statements before the board still showed him to be naive, but nevertheless extremely honest. But more than Oppenheimer's clearance was at stake. Evans expressed greatest concern about the impact a decision against Oppenheimer would have on scientific development in the United States, and on American scientific prestige abroad. Hailed by some as an eloquent defense of Oppenheimer and science, in truth Evans' dissent was barely adequate, not even beginning to refute the arguments which Gray and Morgan had developed in detail.[74]

NICHOLS' RECOMMENDATION

Under established Commission procedures, either the manager of the field office or the deputy general manager at headquarters was responsible for handling security cases in his area. The manager appointed the personnel security board and received its findings. Then the manager notified the subject of the board's recommendation, the manager's decision, and the subject's right to appeal the findings to a personnel security review board. In addition, the manager also had the right of appeal. Should the case be appealed, the review board, if it chose, could take additional testimony, hear oral arguments, or receive supplemental briefs from counsel. Again, the final decision was made by the manager, based on the files, the recommendations of the boards, and his judgment as to the impact upon the atomic energy program if the clearance be denied.[75]

The Oppenheimer case presented the Commission an anomaly, not only because of the importance of the case, but because it was heard at headquarters. Because the Commission had no deputy general manager at the time, the responsibility devolved on Nichols, who of necessity worked very closely with the Commissioners. Furthermore, as Murray, Smyth, and Zuckert argued, the Commission could not avoid accepting direct responsibility in this matter. Under these circumstances, the Commissioners rather than the manager would exercise final judgment in the Oppenheimer case.[76]

Garrison advised Oppenheimer to waive his appeal to a review board so that the case could go directly to the Commission, as he had always wanted. With Oppenheimer's contract due to expire on June 30, there was always danger that a delay would render the case moot, and damagingly unresolved. Unfortunately, having sacrificed his appeal to a review board, Oppenheimer no longer had a forum in which to argue his case. Garrison's request to appear before the Commission to present oral arguments on Oppenheimer's behalf was refused without explanation. This move left Garrison absolutely in the dark about Nichols' recommendation to the Commission. While preparing his rebuttal, Garrison also felt more keenly than ever his failure to secure a clearance. The Commission was required to reject his request for access to the pertinent file material because, at Robb's suggestion, the staff had discontinued processing Garrison's application for clearance during the Gray board hearings.[77]

Nichols' recommendation, presented to the Commission on June 12, 1954, was a forceful document in which the general manager reflected his long distrust of Oppenheimer. From the earliest days of the Manhattan project, Nichols had been uncertain of Oppenheimer's loyalty, and had opposed giving him a security clearance. Even without evidence of disloyalty, Nichols believed Oppenheimer had endangered American security by recruiting questionable people for the program and by seriously disregarding the security system. Candidly, he confessed to the Commission that not until he was appointed general manager had he been in a position to "take action" regarding Oppenheimer.[78] He presented the Commission a brief that might be called the Nichols model for justifying suspension of Oppenheimer's clearance. According to Nichols, the situation

could be described with mathematical curves. While Oppenheimer's access to classified information remained high and constant, his usefulness to the government had been steadily declining since the end of World War II. Nichols also charted Oppenheimer's "Communist associations" on a downward curve between 1943 and 1954, but as associations decreased, the risk from those associations increased. In other words, although usefulness and left-wing associations had decreased, as a consequence of the Cold War the danger from Oppenheimer actually increased.[79] Finally, Nichols was not troubled by the intimation that Oppenheimer's clearance had been suspended on the basis of old information. Quite the contrary, he told the Commissioners, never before had the facts been brought together for a comprehensive review of the files. What was new was the evaluation of all the derogatory information as a piece.

For obvious reasons, Nichols indicated that he concurred in the findings and recommendations of the board, but in fact his letter to the Commission contained a significant shift in emphasis. First, Nichols rejected the findings concerning the hydrogen bomb controversy except "as evidence bearing on Dr. Oppenheimer's veracity." Nichols said that technical opinions could have no security implications unless they were coupled with sinister motives, and "the evidence establishes no sinister motives on the part of Dr. Oppenheimer in his attitude on the hydrogen bomb, either before or after the President's decision." It was, in effect, a rejection of one of the boards's "controlling considerations."

Nichols recommended rejecting Oppenheimer's clearance on three grounds: the Chevalier incident, his lack of veracity, and his past and continuing associations. Nichols thus altered substantially the grounds for decision. With susceptibility to influence and the hydrogen bomb controversy eliminated as considerations, the Commission's refusal to allow oral argument became manifestly unfair. As Smyth prophetically warned: "If we give Dr. Oppenheimer's attorneys no opportunity to comment on the Nichols' letter, we will be open to grave criticism when the letter is published."[80] The Nichols brief, Smyth realized, was an important document in the proceeding and not a simple letter of transmittal.

Nichols, with Robb's assistance, briefed the Commission on his analysis of the case. He emphasized that he had hung the bulk of his findings on the Chevalier affair, the rest being supplemental. "If you feel I am wrong on the Chevalier incident," he told the Commissioners, "then you can say I have gone overboard on some of these other things". Nichols had hoped that Oppenheimer could clarify the Chevalier incident during the hearings, instead of leaving the situation as confused as ever. If Oppenheimer was truly attempting to protect his friend in 1943, Nichols wondered why he had told the "cock-and-bull story," which was far more damaging to Chevalier than his subsequent version given to the FBI in 1946. Although Nichols was upset that Oppenheimer had not been forthcoming, he did not explain why Robb failed to cross-examine Oppenheimer, Groves, or Lansdale on this point. Nor did he explain why the man with the clearest recollection of the events was not called to testify -- William A. Considine, Groves's chief legal advisor.[81]

Nichols thought the Chevalier incident provided the principal evidence for Oppenheimer's lack of veracity. Whichever ways the uncertainty was resolved, Nichols believed Oppenheimer was a liar. But because the unchallenged evidence in the files indicated strongly that the 1943 version of the incident was more accurate than the later less damaging 1946 account, Nichols and Robb saw the possibility that Oppenheimer had lied to the Gray board when he repudiated the "cock-and-bull story." Oppenheimer's motive, Nichols assumed, was the same which had prompted him to request Groves' confidence -- to protect his brother

Frank. Shortly after Oppenheimer's clearance had been suspended by the President, Frank Oppenheimer had denied any involvement in the Chevalier affair.[82] Assuming his confession to Groves was accurate, Oppenheimer obviously could not confirm it without directly impugning his brother. The situation was similar to that in 1946 when FBI agents confronted him with a story that he could not repudiate without hurting Chevalier. In both instances, the simple and more innocent version shifted the burden away from his friend and brother to himself. To some that might have appeared noble, but to Nichols it represented an inexcusable breach of the security system as well as outright lying.[83]

Finally, Nichols was alarmed at the sinister implications of Oppenheimer's visit to Chevalier in Paris in December 1953. The issue was officially labeled "continued associations" in his briefing to the Commission. Nichols expressed his personal fear that Oppenheimer's visit was not entirely social or innocent. "The non-charitable view is this," he explained to the Commissioners, "Why would Oppenheimer of his own initiative come here to Washington to see Ken Fields to get a briefing on weapons, go out to Los Alamos on a briefing of weapons, just prior to going to Paris to see Chevalier?"[84] For Nichols the implication was self-evident and unacceptable. As he had told the Commission, if they accepted his premise concerning the relationship between Oppenheimer and Chevalier, all else would fall into place.

WHITE HOUSE REACTION

At the White House, Eisenhower agreed with Nichols' assessment of the impropriety of Oppenheimer's Paris visit with Chevalier. "How can any individual report a treasonable act on the part of another man and then go and stay at his home for several days?" the President asked. "It just doesn't make any sense to me."[85] Although Eisenhower had his facts garbled (the Chevaliers had only entertained the Oppenheimers for dinner), the President harbored no second thoughts about his suspension of clearance. When informed that Oppenheimer and Garrison under pressure from Reston were contemplating release of both the Gray board findings and Garrison's rejoinder to the Commission, Eisenhower commented that Oppenheimer was acting just like a communist, using all the rules to win public sentiment through martyrdom. Nevertheless, the President was determined above all else that the Commission "must act decent on this and must show the people of the country that we are more interested in trying to find out the facts than to get headlines like McCarthy does."[86]

In addition to the squeeze between Oppenheimer and McCarthy, Strauss reported that the Truman appointees to the Commission -- Murray, Smyth, and Zuckert -- were playing politics with the Oppenheimer case. Murray, especially, was suspected of leaking the Commission's discussion to several newspapers as part of his continuing fight against Strauss. As late as June 10, Strauss estimated that the three Commissioners would vote to restore Oppenheimer's clearance in order to embarrass the Republican administration. Strauss cited the Commission's decision to rule on the case, and its haste to decide the matter before Zuckert's term expired on June 30, as evidence of their determination to save Oppenheimer at the chairman's expense. Eisenhower sympathized with Strauss, and assured him that he was more determined than ever to secure a Republican majority on the Commission following Zuckert's retirement.[87]

Suspicions and acrimony deepened over the debate whether to publish the Gray board hearings. Strauss learned from the FBI that Garrison and Oppenheimer feared publication of the transcript would greatly harm Oppenheimer's case. In order to mitigate the damage, Oppenheimer again discussed with Reston the possibility of releasing prior to the Commission's decision excerpts from the

transcript most favorable to Oppenheimer.[88] Strauss, who naturally wanted to beat him to the punch with a full disclosure of the hearings, encouraged Gray to request publication of the unclassified version of the hearings. Unfortunately for Strauss, Gray had previously assured each witness that the proceedings, in accordance with Commission regulations, would be kept strictly confidential. Furthermore, Gray had promised that the Commission would take no initiative to release information on the hearings. It would seem that the Commission could do nothing but wait for Oppenheimer to act.[89]

Fortuitously, Strauss found his excuse for publication of the hearings. Overwhelmed by the massive transcript and files, Smyth had asked two Commission officials to prepare a summary of the case listing each of Nichols' charges along with Oppenheimer's reply, pertinent file material, and related testimony. The summary of evidence condensed the entire case into 241 convenient pages. Also pressed to review the transcript and evidence, Zuckert obtained a copy of the summary which he took with him on the train to Boston on Saturday, June 12. In the confusion of disembarking his family from the train in Boston, Zuckert forgot to pick up the summary, which was later recovered by the FBI. Strauss, reporting the incident to the White House, relayed his suspicions that Zuckert had actually passed the document on to Oppenheimer's friends. With the material compromised, Strauss believed there was no choice but to publish the hearings as quickly as possible. Murray and Smyth blocked immediate action, principally on the grounds that the Commission had an obligation to protect the confidential testimony of the witnesses. But after Nichols secured releases from the board and witnesses, only Smyth held out against publication, on the grounds that the testimony should not be released until the Commission had made its own decision.[90]

THE COMMISSION DECISION

Strauss did not realize it, but the vote to publish the Gray board hearings anticipated the Commission's ultimate division in the Oppenheimer case. Uncertain of the vote until three days before Oppenheimer's contract was due to expire, Strauss reported to the White House on June 27 that the President's suspension would be upheld by a vote of 4 to 1, Smyth dissenting. Strauss accepted White House congratulations for doing "a wonderful job," but it is problematical whether he personally influenced any decision other than Campbell's.[91]

Actually, the Commission delivered five opinions in the Oppenheimer case. Strauss wrote the majority opinion in which Zuckert and Campbell concurred. Both Zuckert and Campbell, however, also submitted separate opinions of their own. In addition, Murray and Smyth submitted independent opinions in the matter; Smyth's, of course, was a dissent. The decision was officially made on June 28, 1954.[92]

Smyth's dissent offered a logical and sympathetic explanation of the derogatory information in the files. Noting the "clear conclusion" of the board that Oppenheimer was completely loyal, Smyth could not concur that he was nevertheless a security risk. With respect to the Chevalier episode, Smyth found the incident inexcusable, but understandable and without serious consequence for American security. Furthermore, he failed to find any pattern of "continuing association" beyond minor "occasional incidents of a complex life." As for Oppenheimer's alleged lack of veracity, Smyth concluded: "Unless one confuses a manner of expression with candor, or errors in recollection with lack of veracity, Dr. Oppenheimer's testimony before the Gray board has the ring of honesty." According to Smyth, the only question to be determined by the Commission was whether Oppenheimer might intentionally or unintentionally reveal

classified information to persons who should not have it. His character and associations were important only insofar as they indicated the likelihood of security violations. If one began with the assumption that Oppenheimer was disloyal, Smyth continued, the derogatory information might arouse suspicion. But, if the entire record were read objectively, Smyth argued, Oppenheimer's loyalty and trustworthiness emerged clearly, and the various disturbing incidents became understandable and unimportant. Smyth evaluated the whole man: Oppenheimer's contributions to the nation; his disassociation from subversive organizations after 1942; his mature view of the communist threat expressed repeatedly in high government councils between 1945 and 1953; and finally, the high tribute and expressions of confidence given by some twenty-five witnesses of impeccable character and high responsibility in Oppenheimer's behalf. He weighed all this information, the favorable and the unfavorable, and decided that Oppenheimer's employment would not endanger American security, but rather was "clearly consistent with the interests of the national security."

In sharp contrast to Smyth's opinion, Murray was the only person involved in the case to find Oppenheimer "disloyal." Murray offered a legalistic and extremely rigid definition of loyalty. After tracing the derivations of the concept, Murray concluded that a person's loyalty must be judged against obedience to the security system. Such a standard provided the decisive measure of one's loyalty to his government. In addition, the communist conspiracy had created special problems for the United States, which had been forced to erect a system of laws and executive orders designed to protect the government "against the hidden machinery of subversion." When applying his loyalty test to Oppenheimer, Murray found a frequent and deliberate disregard for those regulations which restricted associations, and a seriously deficient cooperation with the security system. On this basis, he determined that Oppenheimer was "disloyal."

Murray's opinion was deficient in several respects. In contrast to every other opinion, he did not specify or allude to any evidence to support either of his findings. In his only reference to the facts of the case, Murray reversed his original position by placing no significance at all on the evidence relating to the thermonuclear controversy. Instead, he eloquently rejected the idea that any influence of disloyalty could be drawn from opinions offered in good faith to the government. Thus one must read between the lines to find the evidence that disturbed Murray. In doing so, it would appear that he based his decision almost entirely upon the Chevalier affair, and particularly on the meetings between Oppenheimer and Chevalier in 1950 and 1953. In strictly following Nichols' logic, however, Murray failed to balance "the whole man" against deviation from the norm of conduct revealed in Oppenheimer's contacts with Chevalier. Murray's opinion was a syllogism founded on a false premise: the security criteria established norms for loyal citizens; Oppenheimer deviated from the norm; therefore, Oppenheimer was disloyal. It is evident that once the hydrogen bomb charges were swept away, Murray had difficulty finding adequate ground for denying clearance. His inflexible standard allowed him to focus on the derogatory facts without evaluating their importance.

On the other hand, Campbell's opinion was ambiguous. In general, he viewed his responsibilty as the narrowest possible appellate review. After summarizing the proceedings against Oppenheimer, he concluded that the board had conducted a fair hearing with honesty and integrity. But Campbell not only sustained the recommendations of the board and the general manager. By signing the majority opinion he also concurred in the Commission's wide-ranging review and reevaluation of the evidence. In view of the striking differences between the board's findings and Nichols' recommendations, Campbell's position made it

impossible to determine just which opinion he accepted. His confusion, however, pointed up the injustice of denying Oppenheimer a chance to answer Nichols' recommendations. Oral arguments before the Commission might have helped to clear the confusion apparent in Campbell's opinion.

Zuckert's statement also differed sharply from Murray's. He rejected Murray's idea that any deviation from the security system amounted to disloyalty. Obviously referring to the Chevalier affair, he stated that no single act of lying, or isolated disregard of security considerations and obstruction of security inquiries, would by themselves have been decisive. But when he perceived "a combination of seriously disturbing actions and events" as were reported in the Oppenheimer case, he decided that risk to security had passed acceptable bounds. Zuckert correctly understood that his task was to weigh the risks presented by the individual against what was "at stake and the job to be done." Zuckert's opinion might be criticized for its failure to state the need for weighing favorable information, which in Oppenheimer's case was considerable, but perhaps this was implicit in his duty "to determine how much of a risk is involved in respect to any particular individual." Zuckert's statement is logical and convincing. It is subject to criticism only by applying Zuckert's standards against the facts of the Oppenheimer case. This task is done in Strauss' analysis of the majority opinion.

The majority decision, Strauss said, stood on two legs: "fundamental defects in character" and Oppenheimer's "associations." Following Nichols' recommendation, Strauss rejected categorically any inference that the Commission's decision was based in any way on Oppenheimer's role in the thermonuclear controversy. As to "character," the majority cited six incidents in which Oppenheimer had behaved improperly. Not surprisingly, the Chevalier affair headed the list. Strauss reflected the same ambivalence towards the evidence as Nichols, and he arrived at essentially the same conclusion. Whether Oppenheimer lied to Pash and Groves in 1943 or to the Gray board in 1954 was virtually academic since the results were about the same: On the one hand, he had lied to federal security officers; on the other, he had committed perjury before the board.

The remaining five illustrations merely supplemented the main example. Strauss reiterated the evidence concerning Lomanitz, Peters, the Seaborg letter, and other incidents. He noted that Oppenheimer had told the FBI in 1950 that he did not know that Joseph Weinberg had been a Communist until the fact became public. As the recording of his 1943 interview with Lansdale revealed, however, Oppenheimer knew Weinberg to be a Communist much earlier. Yet how was this an illustration of his defect in character? What deception could Oppenheimer hope to accomplish by lying to the FBI in 1950 when he had admitted knowing Weinberg to be a Communist in 1943? Clearly, the whole interview revealed nothing but a failure in recollection; but viewed against the Chevalier incident, the lapse suggested to the majority a pattern in which Oppenheimer mitigated his stories after 1946. Significantly, the majority opinion stated that its findings on Oppenheimer's "fundamental defects of character" were not limited to six examples cited, but that "the work of Military Intelligence, the Federal Bureau of Investigation and the Atomic Energy Commission -- all at one time or another have felt the effect of his falsehoods, evasions and misrepresentations." The charge was sweeping and tantalizing in that it suggested there were large reservoirs of information yet untapped in the file. In fact, as Harold Green knew, there was nothing more, unless one looked at the material relating to the hydrogen bomb charges. Perhaps, in a back-handed way, that was what the Commission meant to imply.

To substantiate the second leg of the majority opinion, Strauss cited Oppenheimer's left-wing associations prior to 1942, but was careful to state that these well-known associations were not in themselves a controlling reason for the Commission's decision. Not suprisingly, Oppenheimer's meeting with Chevalier in Paris provided the main basis for this finding. Here the failure to underscore favorable information was particularly damaging because the majority neglected to point out that one of the meetings had included Andrė Malrau, an important advisor to Charles De Gaulle. The most intelligent view of this episode was expressed in the hearings by George F. Kennan, who believed that senior government officials must be permitted maturity of judgment to know when and under what circumstances they can see a person. "If they come to you, sometimes" Kennan stated, "I think it is impossible for you to turn them away abruptly or in a cruel way, simply because you are afraid of association with them, so long as what they are asking of you is nothing that affects your governmental work. I myself say it is a personal view on the part of Christian charity to try to be at least as decent as you can to them."[93]

Kennan's plea for Christian charity succumbed to Nichols' fears of communist conspiracy. In its decision, the majority made no mention of Oppenheimer's work at Los Alamos or to his years of faithful service and devotion to duty. The Commission's decision read like a judgment in a criminal case demanding punishment for misconduct in the past rather than a security evaluation predicting Oppenheimer's future behavior, based upon all relevant data. This failure to evaluate the "whole person" was the Commission's most fundamental error. In the final analysis, even the Commissioners apparently realized the flimsiness of their rationale for denying clearance. They could not in good conscience say that Oppenheimer's clearance would "endanger the national security" or be inconsistent with the requirements of the security system. Instead, they declared that "concern for the defense and security of the United States requires that Dr. Oppenheimer's clearance should not be reinstated." Ironically, neither the Atomic Energy Act nor the regulations required such a finding.

AFTERMATH AND CONSEQUENCES

Decades later, the Oppenheimer case continued to haunt those who participated in it, and to fascinate those who discovered it as history or as legend. It involved, first of all, one of tne most celebrated scientists of modern times, a man whose career seemed to epitomize the awesome role which science had come to play in American life. And, as the Commission's formal opinions made clear, the case did not involve mere political opinions or scientific judgments but more fundamental matters of morality, loyalty and service to one's country, and ultimately the role of the scientist in a democracy. The very terms in which the issue was cast suggested themes that transcended both twentieth-century America and modern science. Some observers could not help thinking of a modern-day Gallileo on trial for speaking the truth about nature, or even a new Socrates accepting the judgments of lesser men. In more contemporary terms, there were those who believed that Oppenheimer, as a victim of McCarthyism, shared a martyrdom similar to Scopes, Sacco and Vanzetti, or the Rosenbergs and Hiss.

If such large implications of the Oppenheimer case did not assure it a place in American consciousness, the publication of the transcript surely did. The transcript, with its hundreds of pages of testimony ranging over the whole history of nuclear development in America since 1942, provided an extraordinary insight into the hitherto secret world of the atomic energy establishment. As one jounalist remarked, "The Oppenheimer transcripts is Operation Candor."[94]

The debate over the hydrogen bomb, the fight among the nuclear scientists and with the Air Force over national defense policy, and scores of other previously classified episodes were outlined in vivid and often embarrassing detail. All the human foibles of petty falsehood, pride, misunderstanding, self-deception, and envy were preserved for all to see. Given the rich human quality of the material and the dialogue from the transcript, it was not surprising that playwrights soon saw the dramatic possibilities of the Oppenheimer case.

For those whose lives were touched directly, the case had added dimensions. None of the participants would ever be the same again. For Oppenheimer and his family, the impact was obvious and devastating, and it did not end with the Commission's decision. The Commission and the FBI were frightened by intelligence reports in August 1954 that Soviet agents were trying to arrange for Oppenheimer's defection and even more by Oppenheimer's decision to take his family on a sailing vacation in the Virgin Islands.[95] Obviously the case had not closed with the stripping of Oppenheimer's clearance and credentials as a government official. For more than a decade, Oppenheimer would linger in exile, cut off from a world that had been the center of his career, a world he had done much to create.

For others the repercussions were long-lasting if not so severe. Strauss, Teller, Borden, Green, Robb, Garrison, Smyth, Murray, and Zuckert would never in the eyes of the public be able to shake off their identification with the case. All would share in varying degrees public criticism and vindication for their roles in the drama. An episode which under other circumstances would have soon passed from public memory, would indelibly mark their careers, taint their subsequent achievements, and embitter relationships among them for years to come.

Vexing and painful as the scars on individuals were, the institutional effects of the Oppenheimer case were probably more significant. Initially the Commission as a federal agency drew relatively little criticism from the public. For the most part, press reaction was not hostile; nor, with the exception of the Alsops' diatribe, We Accuse!, did journalists take up Oppenheimer's cause after the Commission's final decision. Slightly more than three hundred individuals outside the establishment took time to express their opposition to the decision while almost fifty approved.[96]

The greatest criticism came from scientists, especially from those within the atomic community. Even before the hearings were concluded, twenty-seven physicists from the University of Illinois signed a statement in the Bulletin of the Atomic Scientists protesting the hydrogen bomb charges against Oppenheimer. In the same issue, thirteen prominent scientists, including Linus Pauling and Albert Einstein, affirmed their faith in Oppenheimer. Hans Bethe, as president of the American Physical Society, telegraphed the society's denunciation of the Gray board's decision before the Commission's final vote. Petitions signed by eleven hundred scientists and staff from the national laboratories and leading universities expressed indignation at the action against Oppenheimer and warned of damage to Commission programs. Nichols was so concerned about the protest from Argonne that he considered going to Chicago personally, as he had done under similar circumstances in 1945, to explain the government's action to the scientists. He was dissuaded only when Walter H. Zinn, director of the laboratory, assured him that the visit was unnecessary.[97]

Strauss was troubled if not surprised by the scientists' reactions and attempted to explain the Commission's position at the July meeting of the general advisory committee. Recognizing that almost half of the petitioners had worked at Los Alamos, where Oppenheimer had been the wartime director, Strauss decided to present a presidential citation to the laboratory for its

extraordinary achievement. The gesture, dubbed "Operation Butter-Up" by one newspaper,[98] was too transparent to be really effective. There was also some concern expressed through the general advisory committee that the Commission would launch a massive review of security clearances using questionable associations as derogatory evidence. Such fears stemmed directly from the formal opinions of Murray and Zuckert in the Oppenheimer case.[99]

Despite warnings from the general advisory committee of low morale in the Commission's laboratories, no mass exodus of disenchanted scientists occurred. Nor did recruitment for Commission projects lag, or vital programs suffer from a lack of qualified scientists. How the Oppenheimer case affected the career decisions of individual scientists has never been determined in any systematic ways. Some saw the Commission's action as outrageous and sickening; in the minds of others, Oppenheimer got what he deserved. There was, however, a subtle but permanent shift in many scientists' perception of the Commission. Eight years earlier the scientists had seen the Commission as their agency, a new and enlightened institution which among other things could free the scientist from the restraints and indignities of military control. The Commission had justified that faith, but the Oppenheimer case had planted seeds of doubt. It was not likely that an agency which had destroyed the career of a leader like Oppenheimer could ever again enjoy the full confidence of the nation's scientists. To that extent, the effects of the Oppenheimer case were permanent and damaging.

NOTES

1. Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. II of A History of the U.S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), pp. 332-34 (hereafter cited as Atomic Shield); Walter Gellhorn, Security, Loyalty, and Science (Ithaca: Cornell University Press, 1950); Eleanor Bontecou, The Federal Loyalty-Security Program (Ithaca: Cornell University Press, 1953); New York Bar Association, The Federal Loyalty-Security Program (New York: Dodd, Mead, 1956).

2. Henry D. Smyth, Answers to Questions in Stern Letter, Aug. 7, 1967; Mary Smyth Diary, Dec. 2-26, 1953, both in HDS.

3. Murray to Strauss, Dec. 10, 1953, TEM. Page 2 was not provided.

4. Murray to Strauss, Dec. 7, 1953, AEC.

5. Murray Diary Memo, Dec. 8, 9, 1953; TEM.

6. Ibid., Dec. 10, 1953, TEM.

7. LaPlante, Implementation of the President's Directive, entry for Dec. 9, 1953; Strauss Appointment Calendar, Dec. 9-10, 1953, all in AEC.

8. Murray Diary Memo, Dec. 10, 1953, TEM.

9. AEC Press Release 470, Feb 18, 1953, AEC; Belmont to Ladd, Dec. 10, 12, 1953, FBI.

10. Philip M. Stern, The Oppenheimer Case: Security on Trial (New York: Harper & Row, 1969), pp. 225-26 (hereafter cited as Stern, The Oppenheimer Case).

11. Hoover to Strauss, Nov. 27, 1953, FBI.

12. Stern, The Oppenheimer Case, p. 226.

13. Ibid., pp. 227-28; John Major, The Oppenheimer Hearing (London: B.T. Batsford, 1971), pp. 270-71 (hereafter cited as Major, The Oppenheimer Hearing).

14. Hoover to Strauss, Dec. 18, 1953; Belmont to Ladd, Dec. 17, 18, 21, 1953, all in FBI.

15. Belmont to Ladd, Dec. 18, 1953, FBI.

16. Hoover to Tolson et al., Dec. 14, 15, 1953, FBI; Murray Diary Memo on Executive Session, Dec. 15, 1953, TEM.

17. Murray Diary Memo, Dec. 15, 16, 1953, TEM.

18. Nichols, Meeting with Oppenheimer, Dec. 21, 1953, AEC; Belmont to Ladd, Dec. 21, 1953, FBI. Nichol's memorandum, on which this account is based, does not square in all respects with the version presented in Stern, The

Oppenheimer Case, pp. 229-31. Executive Order 10450, Security Requirements for Government Employment, April 27, 1953; Athan Theoharis, Spying on Americans: Political Surveillance from Hoover to the Huston Plan (Philadelphia: Temple University Press, 1978), pp. 210-18.

19. Oppenheimer claimed that Strauss first raised the possibility of resignation in U.S. Atomic Energy Commission, In the Matter of J. Robert Oppenheimer: Transcript of Hearings Before Personnel Security Board (Washington: Government Printing Office, 1954), p. 22 (hereafter cited as Hearings). Nichols stated in his Dec. 21 memorandum that it was Oppenheimer. The disagreement seems trivial since Strauss had promised the Commissioners that he would raise the question in any event.

20. Nichols, Meeting with Oppenheimer, Dec. 21, 1953; CM 999, June 7, 1954, both in AEC; Lewis L. Strauss, Men and Decisions (Garden City, N.Y.: Doubleday, 1962), pp. 276-278.

21. Strauss told Bates that he thought Oppenheimer really wanted to drop the matter quietly but was persuaded by his attorneys, Volpe and Marks, to ask for a hearing. Strauss suspected that their motive was lucrative legal fees. Belmont to Ladd, Dec. 23, 1953, FBI.

22. C.C. Hennrich to Belmont, Dec. 15, 1953; Ladd to Hoover, Dec. 21, 1953; Belmont to Ladd, Dec. 24, 1953; SAC, Newark to Hoover, Jan. 5, 1954, all in FBI.

23. Belmont to Ladd, Jan. 5, 26, 28, 1954, all in FBI.

24. FBI, Newark to Director, FBI, Jan. 5, 1954; Hoover to Strauss, Jan. 26, Feb. 1, 1954, all in FBI; Stern, The Oppenheimer Case, p. 241. Allen B. Ecker also joined Oppenheimer's legal staff before the hearings opened.

25. Garrison to Nichols, Jan. 20, 1954; Rolander to Nichols, Jan. 21, 1954; Rolander to File, Jan. 26, 1954, all in AEC.

26. Mitchell, to File, Feb. 15, 1954; Nichols, to Garrison, Feb. 12, 1954, both in AEC.

27. Mitchell to File, Jan. 19, 1954; Nichols Memo for Record, Jan. 19, 1954; Garrison to Nichols, Jan. 20, 1954, all in AEC.

28. Mitchell to File, March 15, 1954, AEC.

29. Mitchell to Nichols, Jan. 12, 1954, AEC.

30. Mitchell to Morgan, March 9, 1954, AEC; Belmont to Ladd, Feb. 26, 1954, FBI.

31. Belmont to Ladd, Jan. 15, 1954; Hoover to Tolson et al., Feb. 1, 5, 1954, all in FBI; Joseph and Stewart Alsop, We Accuse! (New York: Simon & Schuster, 1954), p. 7. The Alsops neglected to mention that Robb had also served as a court-appointed attorney for Communist Party leader Earl Browder.

32. It is interesting to note that when Drew Pearson charged that Strauss was primarily responsible for instigating the investigation and hearings against Oppenheimer, he omitted any reference to Robb. Most likely Pearson had never heard of Robb either, or if he had, did not regard his appointment as significant. Drew Pearson, Washington Post and Times-Herald, April 20, 1954.

33. CM 962, Feb. 17, 1954, AEC.

34. A list of FBI reports sent to the Commission is attached to Virginia H. Walker to Harry S. Traynor, March 7, 1960, AEC. Most of these reports are available in FBI.

35. Worried about the propriety of providing Robb with such information, Strauss wrote Rolander: "I understand that you contemplate reproducing communications which I have received from the Federal Bureau of Investigation. This must not be done without the knowledge and consent of the Bureau, and I shall assume that unless I hear to the contrary, you have obtained this permission." Strauss to Rolander, March 9, 1954, AEC. No memorandum to the contrary was found in the files. Results of the telephone taps were reported daily to Washington. For example, see SAC, Newark to Director, FBI, February 24, March 1, March 25, 1954, all in FBI. For examples of surveillances while Oppenheimer was traveling, see FBI report on Rochester trip, Feb. 23, 1954; FBI Wash Field to Director, FBI, March 3, 1954; FBI Boston to Director, FBI, March 8, 1954, all in FBI.

36. During February and March 1954 Hoover sent up to three reports to Strauss daily on the Oppenheimer case. Copies are in FBI. See especially Hoover to Strauss, Feb. 18, March 3, 11, 16, 19, 25, 1954, all in FBI.

37. Rolander to File, Feb. 16, 1954; Rolander to Bates, Feb. 17, 18, 19, 1954, all in AEC; Belmont to Ladd, Feb. 2, 1954; Belmont to L.V. Boardman, March 29, 1954; Branigan to Belmont, March 31, 1954, all in FBI.

38. Rolander to File, Feb. 16, 1954; Rolander to Bates, March 1, 1954, both in AEC; Hoover to Strauss, Jan. 22, April 19, 1954, both in FBI.

39. Belmont to Boardman, April 6, 1954, FBI; Rolander-Robb-Borden interview, Feb. 20, 1954, AEC. Borden also supplied a list to the FBI bringing the total to about 38.

40. Rolander to File, Feb. 25, March 15, 22, 1954, all in AEC; Hearings, pp. 178-79, 266-70.

41. Rolander to File, March 15, 18, 1954, AEC.

42. Murray Diary Memo, Jan. 29, 1954, TEM.

43. E.R. Trapnell to Strauss, Oct. 26, 1953, AEC.

44. Belmont to Boardman, April 11, 1954, FBI; Major, The Oppenheimer Hearing, p. 9.

45. Stern, The Oppenheimer Case, p. 243-44.

46. Hagerty Diaries, April 7-11, 1954, DDE.

47. Oral history interview with Gordon Gray by Robert Hopper, Washington, D.C., March 7, 1967, DDE.

48. Mitchell to File, April 5, 1954; Rolander to File, April 14, 1954; Strauss to Rolander, April 26, 1954, all in AEC. See also, Hearings, pp. 527-28. Of the scientists mentioned by Gardner, Strauss noted: "In addition to being witnesses, [they] are also active workers on Oppenheimer's team. I think in their records in the future we can't overlook this." Telephone conversation between Strauss and Mitchell, May 10, 1954, AEC; Belmont to Boardman, May 10, 1954, FBI.

49. Rolander to File, April 12, 1954, AEC; Belmont to Boardman, April 24, 1954, FBI.

50. Hearings, pp. 565, 53-55; Stern, The Oppenheimer Case, pp. 263-64.

51. The Gray board proceedings, which were published by the Atomic Energy Commission, have been exhaustively analyzed by several scholars, including: Stern, The Oppenheimer Case; Major, The Oppenheimer Hearings; Charles P. Curtis, The Oppenheimer Case: The Trial of a Security System (New York: Simon & Schuster, 1955); Joseph and Stewart Alsop, We Accuse! (New York: Simon & Schuster, 1954); Cushing Strout, "The Oppenheimer Case: Melodrama, Tragedy, and Irony," Virginia Quarterly Review 40 (Spring, 1964), 268-80. This account does not recapitulate the Gray board proceedings in detail.

52. Gray to Mitchell, May 10, 1954, AEC.

53. Dean Diary, Nov. 24, 1952, AEC; Hearings, p. 16-17, 216, 306, 335-336; Branigan to Belmont, May 13, 1954, FBI.

54. Atomic Shield, pp. 391-92; U.S. Atomic Energy Commission, In the Matter of J. Robert Oppenheimer: Texts of Principal Documents and Letters of Personnel Security Board, General Manager, Commissioners (Washington: Government Printing Office, 1954), p. 13 (hereafter cited as Principal Documents); Hearings, p. 19.

55. Hearings, pp. 679-97, 742-70.

56. Garrison Norton to Finletter, July 1, 1952, AEC. See also Hearings, pp. 771-73.

57. Hoover to Waters, April 16, May 19, 1952, AEC. The scientist did not repeat his doubts about Oppenheimer's loyalty to the Gray board. Hearings, pp. 697-709.

58. Hoover to Waters, May 19, 1952, FBI; Hearings, pp. 328-29.

59. Rolander to File, March 15, 1954, AEC. Italics added.

60. Hearings, p. 710.

61. Ibid., p. 726. Italics added.

62. FBI Field Report, George C. Eltenton, June 28, 1946, FBI.

63. Ibid.; FBI Field Report, Eltenton, July 3, 1946, FBI.

64. Hearings, pp. 14, 131, 137-39, 146-49, 285-300.

65. Hoover to Strauss, Dec. 18, 1953, FBI; LaPlante, Memo for File, Dec. 17, 1953, AEC; Hearings, pp. 167-68.

66. FBI Field Report, Eltenton, June 28, 1946, July 3, 1946, both in FBI.

67. FBI Field Report, Eltenton, Sept. 18, 1946, FBI.

68. Hearings, pp. 137-38, 145-46, 887-88.

69. Ibid., p. 263.

70. Ibid., p. 167.

71. Hooper interview with Gray, DDE; Summary of Oppenheimer Hearing, May 29, 1954; Director, FBI to SAC, San Francisco, May 28, 1954; Belmont to Boardman, June 2, 1954, all in FBI.

72. Gray to Nichols, May 27, 1954, in AEC 735, May 28, 1954, AEC.

73. Hooper interview with Gray, DDE.

74. Stern, The Oppenheimer Case, pp. 379-82; Major, The Oppenheimer Hearing, p. 187; Minority Report of Dr. Ward V. Evans, in AEC 735, May 28, 1954, pp. 34-36, AEC.

75. Mitchell to Nichols, May 20, 1954, AEC. The security clearance procedures in effect at that time had been adopted in September 1950. Code of Federal Regulations, Title 10 - Atomic Energy, Part 4, Security Clearance Procedures.

76. CM 987, May 18, 1954, AEC.

77. Garrison to Nichols, June 1, 9, 1954; Nichols to Garrison, June 3, 24, 1954; CM 997, June 3, 1954; CM 999, June 7, 1954; CM 1001, June 9, 1954; Rolander to LaPlante, May 3, 1954, all in AEC.

78. Transcript, CM 1007, June 15, 1954, p. 61, AEC. Nichols' recommendation was published in Principal Documents, pp. 43-48.

79. Transcript, CM 1008, June 16, 1954, pp. 72-74, 78, AEC.

80. Smyth to the Commissioners, June 21, 1954, AEC.

81. Transcript, CM 1007, June 15, 1954, pp. 66-67, AEC.

82. FBI Field Report, Oppenheimer, Dec. 31, 1953, FBI.

83. Transcript, CM 1008, June 16, 1954, AEC.

84. Transcript, CM 1008, part 2, June 16, 1954, pp. 54-55, AEC. Kenneth E. Fields was the AEC director of military application.

85. Hagerty Diary, June 1, 1954, DDE. For published excerpts from the Hagerty Diary, see Robert H. Ferrell, ed., The Diary of James C. Hagerty: Eisenhower in Mid-Course, 1954-1955 (Bloomington: Indiana University Press, 1983).

86. Hagerty Diary, May 29, 1954, DDE.

87. Ibid., June 1, 10, 1954, DDE; Belmont to Boardman, June 4, 1954, FBI.

88. Transcript of telephone conversation between Reston and Oppenheimer, June 11, 1954, JRO.

89. Gray to Rolander, June 9, 1954, AEC.

90. CM 1003, June 12, 1954; CM 1004, June 14, 1954; CM 1005, June 14, 1954; CM 1006, June 15, 1954; CM 1007, June 15, 1954; Smyth, Memo to the Commission, June 14, 1954, all in AEC; SAC, Boston to Director, FBI, June 14, 1954, FBI.

91. Hagerty Diary, June 27, 1954, DDE.

92. CM 1011, June 28, 1954, AEC. All five opinions were published in Principal Documents. They were also published in New York Times, June 30, 1954, p. 12.

93. Hearings, pp. 54, 365.

94. Ralph E. Lapp, "Atomic Candor," Bulletin of the Atomic Scientists 10 (Oct. 1954), 336.

95. Hoover to Strauss, June 18, 1954, FBI; Nichols to R.W. Scott McLeod, June 23, 1954; Warren Olney III to Mitchell, June 25, 1954; Hoover to Strauss, July 20, 1954, all in AEC; Hoover to Waters, Aug. 11, 26, 27, 31, 1954, all in FBI; Rolander to Nichols, Aug. 10, 26 (two memoranda), 30, 1954, all in AEC; Hoover to Tolson et al., June 29, 1954; FBI Summary, July 2, 5, 14, 1954; Deputy Director, Plans, CIA to Director, FBI, July 9, 1954; R.R. Roach to Belmont, July 9, 1954; CIA Memo I-2, Aug. 23, 1954; SAC, Newark to Director, FBI, August 24, 1954; Belmont to Boardman, Aug. 24, 1954, all in FBI.

96. The letters are on file in AEC.

97. "Scientists Affirm Faith in Oppenheimer," Bulletin of the Atomic Scientists 10 (May 1954), 188-91; Bethe to Strauss, June 10, 1954; Merle Burgy, et al. to Chairman and Commissioners, June 17, 1954; William Rubinson to L.J. Haworth, May 12, 1954; William Nelis to Strauss, June 25, 1954; Fred L. Ribe to Eisenhower, June 15, 1954; Authur H. Snell, et al. to the Commissioners, Oct. 11, 1954; Robert Christy, et al. to Strauss, June 21, 1954; Sidney Drell to Eisenhower, May 27, 1954; CM 1012, June 30, 1954, all in AEC.

98. Santa Fe New Mexican, July 18, 1954.

99. GAC 41, July 15, 1954, AEC.

CHAPTER 5
THE POLITICAL ARENA

James R. Newman, one of the authors of the Atomic Energy Act of 1946, described the law as establishing "in the midst of our privately controlled economy a socialist island with undefined and possibly expanding frontiers."[1] Newman was referring to the sections of the act that gave the Commission absolute control over all fissionable materials, all facilities using or producing such material, and all information related to nuclear technology. Under the almost inflexible provisions of the law, the Commission had virtually dominated the development of nuclear technology in the five years since 1947. Other sections of the act exempted the Commission from the civil service system and from many of the administrative laws and regulations that applied to other government agencies. These exemptions gave the Commission an unusual degree of flexibility in administration and made possible the recruitment of a staff with capabilities that were exceptional in the civil service. Furthermore, the enormous sums appropriated by the Congress for military applications of atomic energy insured the agency a "standard of living" that few of the cabinet departments enjoyed.

Living in this rarified atmosphere, the Commission could afford to exercise an unusual degree of independence from both the executive and legislative branches of the government, from the pressures of lobbyists and special interest groups, and from the political process as a whole. Before 1953 the Commissioners could say with more truth than could most government executives that their agency was untouched by the stain of politics.

The golden days of privilege and isolation, however, were beginning to fade in 1953. The rising interest in nuclear energy within American industry, the determination of the Eisenhower Administration to reverse the trend toward greater governmental control of the economic system, the growing opportunities to use nuclear energy for civilian purposes and to encourage international cooperation as a way to world peace -- all these forces stimulated public interest in liberalizing the Atomic Energy Act of 1946.

The result of these efforts would be in part to establish at least some bridges between the "island of socialism" and the mainland of the nation's "free enterprise system," to open new channels for disseminating nuclear technology, and to reduce the extent of the government monopoly. The process of amending the act would itself begin to lead the Commission and its staff out of the secret, sealed-off world of the atom. The points at issue in the legislative debate were not so much those involving the special considerations of nuclear technology, but rather such broad policy questions as the role of government and private industry in the nation's energy economy. Such a debate alone would have inevitably entangled the Commission in the web of partisan politics. As it happened, the Dixon-Yates controversy, as Commissioner Zuckert put it, was "to deflower the AEC in a political sense."[2] By the summer of 1954, when the new legislation took effect, the Atomic Energy Commission would find itself in the middle of the political arena.

LEGISLATION FOR PRIVATE INDUSTRY

In formulating a nuclear power policy for the Eisenhower Administration in the spring of 1953, the Commission had drafted legislation that was intended to

NOTES

1. James R. Newman and Byron S. Miller, The Control of Atomic Energy: A Study of Its Social, Economic, and Political Implications (New York: McGraw-Hill, 1948), p. 19.

2. Arnold Kramish and Eugene M. Zuckert, Atomic Energy for Your Business: Today's Key to Tomorrow's Profits (New York: David McKay, 1956), p. 130.

3. See Chap. 2, pp. 21-23.

4. General Counsel, Draft Legislation to Encourage Development of Nuclear Power, AEC 615/8, May 11, 1953, AEC. For the final version of the bill, see AEC 615/9, May 21, 1953, AEC.

5. Joint Committee on Atomic Energy, Transcript of Hearing on Nuclear Power Policy, May 26, 1953; Weeks to Dodge, June 23, 1953, in AEC 615/14, June 26, 1953; Excerpts from Executive Agency Comments on Proposed Legislation, AEC 615/11, June 15, 1953, all in AEC.

6. For background and evolution of the AEC position, see Patent Policy in Connection with Industrial Development of Atomic Power, AEC 615/10, June 1, 1953, AEC.

7. CM 872, June 3, 1953; CM 873, June 8, 1953, both in AEC.

8. CM 882, June 26, 1953, AEC.

9. CM 890, July 20, 1953, AEC.

10. Decision Summary on Topnotch II, Sept. 27, 1953; General Counsel, Proposed Legislation to Encourage Development of Peacetime Uses of Atomic Energy, AEC 615/22, Oct. 14, 1953; CM 930, Oct. 21, 1953, all in AEC.

11 The housekeeping amendments included changes in AEC organization and additional provisions for criminal prosecution in matters relating to security. Legislative Proposals by AEC, AEC 495/5, Feb. 24, 1953, AEC.

12. General Counsel, AEC Legislative Program for 1954, AEC 495/9, Sept. 28, 1953; CM 927, Oct. 14, 1953, both in AEC.

13. Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. I of A History of the U. S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), pp. 283-314.

14. Strauss to Eisenhower, Robert LeBaron, and Dodge, separate letters with attachments, all dated Nov. 18, 1953, in AEC 495/11, Nov. 20, 1953, AEC.

15. General Counsel, Clearance of Atomic Power Legislation for White House, AEC 615/29, Dec. 7, 1953; General Counsel, Atomic Power Legislation, AEC 615/30, Dec. 9, 1953; CM 945, Dec. 10, 1953, all in AEC.

CHAPTER 6
NUCLEAR WEAPONS: A NEW REALITY

Two hours before dawn on a chilly March morning in 1953, Newsweek correspondent Leonard Slater huddled with nineteen other newsmen in a dirt trench on Yucca Flat within the Commission's Nevada Proving Grounds. Slater had been selected to accompany an infantry unit into advance positions just 3,500 yards from a steel tower holding a test version of a full-scale atomic bomb. Like hundreds of observers before and after him, Slater had endured hours of boredom as he awaited the detonation, but there was something special about this test: Slater and the troops were closer to ground zero than anyone had been since the Hiroshima and Nagasaki attacks.

Shivering more from the anticipation than from the cold, Slater heard the final countdown over the public address system, blinked in momentary shock as the nuclear fireball lit the trench brighter than the noonday sun, braced himself for the shock wave, and listened for what seemed like minutes for the dull roar generated by the detonation. Scrambling from the trench at the "all-clear" announcement, Slater and his companions watched in awe the purplish fireball swirling upward from the desert floor. Within minutes the familiar mushroom cloud, nearly five miles high, was forming where the shot tower had been.

At Alamogordo in 1945 the first atomic test had drawn from observers comparisons with scenes in the apocalypse. Little more than seven years later at Yucca Flat, Slater detected a tone of condescension among the troops. One officer thought the trip hadn't been worth the effort. Others compared the blast unfavorably with the flash and concussion produced by a standard artillery piece. In a matter of minutes soldiers with radiation monitoring equipment were calmly moving out in jeeps in the direction of ground zero.[1]

This striking change in reactions to the bomb was more than just a matter of time. Oppenheimer and his associates at Alamogordo had seen Trinity in terms of their own intimate experiences in building the bomb and their knowledge of its size and physical characteristics. It had been truly terrifying to witness what their groping with theory and experimental evidence had produced. For those who came to Yucca Flat, however, the bomb was not a finite experiment in physics. It had become in the popular mind a specter of enormous power, of superhuman dimensions, seemingly greater even than the ordinary forces of nature. The troops' reaction to the detonation of a very small atomic bomb, witnessed at a distance of about two miles, did not measure up to the image which popular literature had evoked in their minds. As with all physical phenomena, the meaning lay in the eyes of the beholder.

But the 1953 tests would give thousands of Americans an opportunity to witness the power of the atomic bomb directly, while millions of others around the world through the eyes of television, newsmen, and photographers could experience the bomb in terms they could understand. This time the bomb was not being tested solely on warships as at Bikini or on military equipment, but on such familiar objects as automobiles, white frame houses, fences, telephone poles, power lines, packaged foods, and aspirin. These artifacts from the everyday world provided a human scale against which the ordinary citizen as well as public officials could measure the significance of the bomb. Furthermore, the tests were being conducted in the continental United States, where their progress would be reported week by week in the press, on radio and on television. The bomb would no longer be a vague, mysterious instrument of infinite disaster but rather a dangerous and immediate reality in American life.

UPSHOT-KNOTHOLE

The test series which began on March 17, 1953, was the product of more than a year of planning by the Commission, the Department of Defense, and the Federal Civil Defense Administration. Even before the Tumbler-Snapper series was concluded in the spring of 1952, Los Alamos began to formulate requirements for another continental test series designated as Operation Upshot. Although no one knew exactly what experimental devices would be tested, the Los Alamos scientists were certain that the first detonation of the thermonuclear device and the huge fission weapon called King would raise many questions which could be answered only by further experiments. The Nevada Proving Grounds was too close to urban areas (65 miles from Las Vegas) for testing multi-megaton devices like Mike or even fission devices, like King, which exceeded 100 kilotons; but it was far more economical and convenient than Enewetak for tests of smaller yields, which would provide essential information for designing the components of both thermonuclear and fission weapons. Twenty shots in two previous Nevada tests in 1951 and 1952 had demonstrated the value of a continental test site.[2]

The other half of the test series was Operation Knothole, which would include a variety of experiments for both the Department of Defense and the Federal Civil Defense Administration to determine the implications of nuclear detonations for both people and equipment. The enormous expense and complexity of nuclear tests made it imperative to integrate the objectives of both Upshot and Knothole. There were special advantages of a dual test series in Nevada where, unlike Enewetak, there was plenty of room to deploy thousands of troops and military equipment and where it was relatively easy to set up civil defense experiments. But a dual test series had disadvantages, particularly for the Commission's weapon laboratories. The efficient conduct of Knothole required firm schedules set long in advance. Operation Upshot, on the other hand, was essentially a series of field experiments in a rapidly developing technology and, therefore, constantly subject to change. As early as the Greenhouse tests in 1951, the Los Alamos scientists had discovered the inhibiting effect of dual operations when they were not able to take advantage of continuing research because a design change to increase yield would have upset plans for both tests of military effects and biomedical experiments. Dissatisfied as the scientists were with the prospects of a dual test series, there was no way to avoid it.[3]

By early 1953 the test program was set. Los Alamos would have five shots that would be primarily related to diagnostic experiments, although all would involve civil defense or military effects or both. The new weapon laboratory at Livermore had scheduled two specialized experiments to check novel design principles for weapons; neither of these tests was encumbered with military or civil defense projects. Finally, Los Alamos had scheduled three shots which were primarily related to effects. Five of the six diagnostic shots would be fired on three-hundred-foot towers for precision in data collections. The sixth diagnostic shot was planned to verify yield only and could be air-dropped to fire at a relatively high altitude in order to reduce the uptake of ground dust in the radioactive cloud. Two of the tests of military effects were also to be air-dropped to simulate combat conditions for the troops. The third military shot was an atomic artillery shell to be fired from a 280-millimeter cannon.[4]

OPERATION UPSHOT-KNOTHOLE

	SHOT	DATE 1953	TYPE	YIELD (KILOTONS)
1.	Annie	March 17	Tower	16
2.	Nancy	March 24	Tower	24
3.	Ruth	March 31	Tower	0.2
4.	Dixie	April 6	Airdrop	11
5.	Ray	April 11	Tower	0.2
6.	Badger	April 18	Tower	23
7.	Simon	April 25	Tower	43
8.	Encore	May 8	Airdrop	27
9.	Harry	May 19	Tower	32
10.	Grable	May 25	Gun	15
11.	Climax	June 4	Airdrop	61

THE CIVILIAN DIMENSION

Along with the twenty newsmen and the troops in forward positions for the March 17 shot was Val Peterson, the newly appointed Federal Civil Defense Administrator.

Peterson's presence was just one more way of demonstrating the importance of civil defense activities in the Upshot-Knothole tests. For more than a year the civil defense agency had been planning for this day. Originally hoping to have a shot of its own, the agency, like the Commission and the military services, had finally accepted the necessity for a combined operation.

The day before the first shot, Harold L. Goodwin, the director of FCDA's operations staff, briefed the press on the experiments set up on Yucca Flat. None had proved more fascinating during the press tour of the site than the two frame houses built 3,500 and 7,500 feet from ground zero. These two-story, center-hall dwellings with basements were typical of thousands of American homes. They were complete except for interior finish, plaster, and utilities. Government-surplus furniture, household items, and fully-dressed manikins were installed in the houses to measure damage. House No. 1, closest to ground zero, was expected to be completely destroyed by blast and had been equipped with reflective paint and venetian blinds to keep it from burning. The house at 7,500 feet would be damaged but probably not destroyed. Two types of blast shelters were located in the basements of the houses; they were designed to protect occupants from the heavy debris load of the collapsing structure. Eight other shelters designed by FCDA for backyard use had been built nearby.

Also of great press interest were the fifty automobiles of various types, colors, and operating conditions placed at different distances and orientations from ground zero. Some of the cars contained manikins. Goodwin told the reporters that these tests were especially important because they would indicate whether the family car would provide any effective protection against the radiation, heat, and blast of a nuclear bomb.[5]

The third major FCDA project was the testing of four types of calibrated instruments which would record the angle of incidence of thermal energy from the bomb and thus help to determine its exact air-zero position. Such information would be essential to civil defense officials in directing rescue teams and estimating damage and casualties. FCDA had also planned several classified projects for later shots in the series to test blast effects on standard wall

panels and partitions, to determine the effects of radiation on lungs, and to measure the reliability of radiation survey instruments.

Important as the technical results of the civil defense experiments would be, they would have even greater value in giving the general public some impression of what an atomic attack could mean in everyday life. For this purpose the Commission and FCDA had jointly organized an elaborate public information plan for the March 17 test and several others later in the series. More than 250 newsmen and 360 state governors and mayors, and county and civil defense officials had been invited to visit the site before the Annie shot, observe the test, and if possible inspect the results. Reporters and photographers would have an excellent vantage point from a rise dubbed "News Nob" on the edge of Yucca Flat, and there was to be live radio and television coverage.

The shot on March 17 was successful in both its technical and informational aspects. The countdown went smoothly and the yield was close to the planned 15 kilotons. House No. 1 was destroyed by blast as planned, and the high-speed camera shots of its destruction provided a series of dramatic photographs which were widely published in newspapers and magazines.House No. 2 suffered some damage but remained intact as predicted. The battered manikins provided graphic evidence of the vicious power of the weapon. The basements proved to afford good protection against radiation and the simple basement shelters were effective against debris. The family automobile would be relatively safe outside a ten-block radius for a small weapon of this type, provided that some windows were left open to prevent the roof from being caved in on the passengers. Most of the heavily damaged cars that did not burn and were not radioactive could be driven away soon after the shot.[6]

News coverage of the shot was excellent, as expected. Most daily newspapers and weekly newsmagazines covered the story with special reports and photographs. A television audience estimated at eight million viewers had a somewhat less than satisfactory impression of Annie, particularly in establishing some sense of scale, but reporter Chet Huntley's somber descriptions of the drama from the forward trenches were judged impressive. Most newspapers gave their readers adequate factual accounts of the test and pointed up the implications for civil defense. Some even reminded readers that the absence of total destruction resulted from the relatively small size of the device and the long distances from ground zero to the experiments and the observers.

Probably more significant than the first news stories were the follow-up articles by state and regional civil defense officials in their local newspapers. These articles were important in translating the effects of Annie into terms that had meaning in neighborhood surroundings and stressed the substantial value of even the simplest precautions in the event of a nuclear attack. These local appeals were supported naturally by Peterson's hard-hitting plea for national action on civil defense with Eisenhower's strong endorsement.[7] With careful planning Peterson and his associates had been able to capture the Nation's attention with the March 17 event, and they were able to sustain much of this interest as the tests proceeded during the spring of 1953.

THE MILITARY SPHERE

Vital as the civil effects tests appeared to be for national security, the military implications for Upshot were even more critical. Largely hidden from public view was the vast complex of government organizations, military units, scientific laboratories, and private contractors that made the tests possible. Unlike the Pacific tests which were directed by a joint military task force for

the Commission, the continental tests at Nevada were entirely in the hands of the Commission. The line of authority led through the headquarters division of military application, headed by Brigadier General Kenneth E. Fields, to Carroll L. Tyler, manager of the Commission's Santa Fe operations office, who served as test manager. Because all previous continental tests and all but two in Upshot depended on research at Los Alamos, officials of that laboratory under the direction of Alvin C. Graves were in charge of scientific aspects of the tests. Herbert F. York, a young physicist who would later be officially designated director of the new Livermore laboratory, worked with Graves in staging the two Livermore tests. Military operations were coordinated through the Albuquerque field command of the Armed Forces Special Weapons Project, established in the Pentagon soon after World War II to handle atomic energy matters for all three military services.[8]

Shots scheduled for Upshot and other series at the Nevada site in the 1950s typically involved a wide variety of purposes, and as many as possible were incorporated in a single shot. Some shots included fundamental research in nuclear physics which would test the feasibility of new theoretical approaches to weapon design. Others provided technical data for full-scale production engineering of a new weapon. Often shots were planned to explore phenomenon that could affect the efficiency and performance of weapons but that were not susceptible to theoretical analysis. Sometimes shots were designed to provide a basis for choice between two or more theoretical methods of weapon improvement or to gain time by eliminating the need for months of calculations and laboratory experiments. In the Upshot series several shots were designed to test components that would be used in new weapon designs. Only occasionally was it necessary to proof-test complete or stockpiled weapons, and such tests were combined whenever possible with studies of weapons effects, both for civilian and military purposes. In most instances the shots consisted of highly instrumented experimental devices rather than complete weapons.[9]

In terms of direct participation, the most important part of Upshot-Knothole for the armed services were the weapon effects tests. Under the technical direction of the Armed Forces Special Weapons Project, these tests were designed to reveal tactical problems involved in the use of nuclear weapons, to determine the effects of radiation and blast on military equipment, and to give combat troops experience in maneuvers with nuclear weapons. Exercise Desert Rock V involved more than fifteen thousand ground troops of the Army, Navy, Marines, and Air Force. The placement of combat units in advanced positions, as was done for the Annie shot, continued during the series. In subsequent shots, officer volunteers occupied positions as close as two thousand yards from ground zero. Larger numbers of combat troops were stationed about twice that distance from the blast.

The military services also provided vital support functions for the tests as they had in all such exercises since the Sandstone tests in the Pacific in 1948. The Air Force furnished weather services, about 25 aircraft, and 1,000 civilians and military personnel in direct support of the series. At least fifty combat and other operational aircraft were involved in dropping test devices, cloud sampling and testing, radiological terrain surveys, photography, training, and data collection.

HAZARDS OF CONTINENTAL TESTING

The Nevada Proving Ground did offer substantial advantages over Enewetak or Bikini for testing nuclear devices and defense against nuclear attack, but the rapidly expanding use of the continental test site also posed an ever increasing threat to the American public. The potential hazards in continental testing had

been weighed against defense requirements before the Alamogordo test in 1945 and had been considered again by the Commission before the first Nevada tests were authorized in 1951.

In planning and executing the twenty continental tests before Upshot-Knothole, the Los Alamos scientists had acquired considerable skill and experience in predicting the potential hazards and minimizing them. That these capabilities had reached a level of some sophistication was clearly evident in the special fifty-page section on "Public Safety in Continental Weapons Testing," which the Commission published as part of its thirteenth semiannual report to the Congress in January 1953. To be sure, there was a certain amount of special pleading in the title of the report and its contents. The purpose of the report, after all, was to reassure the American people, not to present an even-handed analysis that would have candidly described the uncertainties involved. But in the light of the extreme secrecy that still prevailed in Commission activities at that time, the report was surprisingly detailed and informative. It reviewed the reasons for establishing the Nevada Proving Grounds in the first place; it described in a straightforward manner the flash, airblast, and radiation effects of nuclear detonations; and it clearly acknowledged radiation as the most serious hazard. The report honestly discussed the origin and rationale for maximum permissible doses of radiation, both on the surface of the human body and internally, and the implications of fallout in terms of both somatic and genetic effects. The report concluded that "there is negligible hazard to property from blast; that proper warnings and patrolling have prevented any injury to humans from heat, light, or blast; and that the highest levels of radioactivity released by fall-out of particles are well below the very conservative standards fixing the amounts of radiation that can be received externally or internally by the human body without harming the present or later generations."[10]

What the public report did not reveal was the growing uneasiness within the test organization over the difficulty of holding radiation effects below the standards set forth in the report. About the time that the public report was released, Tyler convened a special committee at Los Alamos to appraise the operational future of the test site. The committee included not only Los Alamos scientists and military officers from Washington but also the Commission's directors of public information and biology and medicine. After concluding that the Nevada Proving Ground was "vital" to weapon development, the committee found that considerations of public safety were the major restriction on the type and size of devices tested at the site and that this restriction was related mostly to yield, placement of the device or mode of delivery, and resulting fallout near the site. There would have to be "a very strong, overriding reason" to justify a surface or sub-surface shot exceeding one kiloton. A tower shot over 35 kilotons should be fired "only under very stable, predictable [weather] conditions." Airbursts should not exceed 50 kilotons until the laboratory could further assess the probability that a fuse failure might turn an aerial device into a surface shot. The committee admitted that luck as well as good planning had prevented fallout radiation from exceeding the established standards in past tests. To reduce this possibility in the future the committee recommended new firing sites, less frequent use of each site, aluminum towers, higher towers, and soil stabilization at the base of the towers.[11]

Because plans for Upshot-Knothole were virtually complete when the Tyler committee met, the report probably reflected an effort to evaluate the hazards posed by the series rather than an attempt to establish a ceiling for shots scheduled in the series. In any case, the report was an internal document which was not sent to the Commission in Washington until May 1953, when two-thirds of

the series had been completed. Certainly Graves and the test group did not think it necessary to comply literally with the guidelines stated in the report. Of the seven tower shots scheduled for Upshot-Knothole, four were expected to reach or exceed the 35-kiloton ceiling recommended by the committee. Because all the shots were in several respects experimental, it was not possible to predict yield exactly, and the actual yields in some cases exceeded, and in others fell short of, the estimates.[12] The test group clearly expected substantial fallout beyond the test site, but drawing on experience in earlier series, there was confidence that the monitoring teams could quickly detect fallout patterns after each shot in the Upshot-Knothole series. The plan was to warn people in communities to take shelter if significant fallout appeared to be coming in their direction. In fact, it was not always possible to contact isolated prospectors and ranchers.

Although offsite fallout was in some way related to yield, the relationship was not linear. It was possible to exceed the 35-kiloton limit without significant offsite fallout. The test group had greatly improved its ability to determine from weather data the probable direction and speed of the radioactive cloud and thus to select firing times that would result in a minimum of offsite fallout. Despite these precautions, however, there was some offsite fallout from seven of the ten shots originally scheduled for the series.[13]

There was no easy way to determine what the health hazard of this fallout was, but with the intention of providing a conservative margin of safety the test group had established a maximum permissible weekly exposure of 0.3 roentgen (a physical unit of measure defined in terms of the ionizing effect of X-rays). This limit was derived from standards recommended by the National Committee on Radiation Protection and the International Commission on Radiological Protection in 1950 on the basis of data accumulated over several decades of industrial and clinical experience. The best authorities at that time believed that the human body was capable of repairing most if not all of the somatic damage produced by 0.3 roentgen over a one-week period. In fact, Commission scientists believed that a rapidly delivered dose of about 25 roentgens of whole-body radiation was required to produce permanent damage in humans. Because Upshot-Knothole was planned to occur over a period of three months, or thirteen weeks, the test group simply extrapolated the 0.3-roentgen figure to cover that period. Thus, the guideline for the series became 3.9 roentgens.[14]

Also to be considered was the genetic damage that might be caused by this amount of radiation. As the Commission's semiannual report informed the public in January 1953, scientists agreed that genetic mutations were directly proportional to dose, with no recovery or repair processes at work. Daily or weekly repetitions of such doses could produce a noticeable increase in the number of mutations among offspring. The determination of the effects of radiation on mutation rates was a difficult process which required experiments with large numbers of laboratory animals over many years. Preliminary data then available on mice suggested that exposing the germ cells to 80 roentgens would double the natural rate of human mutations. Obviously the less radiation received by the genes, the better.

The test group never considered the 3.9-roentgen figure as an outside limit which could be approached without concern. The large uncertainties about the effects of radiation required that exposures be held to the lowest possible levels. The first precaution was to fire the shot only under weather conditions that would preclude the radioactive cloud from moving rapidly from the test site and in a direction that would carry it over populated areas. Secondly, the test group routinely used an elaborate system of fixed air-sampling stations and mobile teams to monitor fallout in the area within 200 miles of the test site.

Beyond that distance mobile units and 121 stations manned by the U. S. Weather Bureau collected air samples for analysis at the Commission's Health and Safety Laboratory in New York City.[15]

FALLOUT IN UPSHOT-KNOTHOLE

The test group's monitoring teams were able to determine fallout patterns very quickly after each shot. The radioactive cloud from the first, or Annie, shot did move due east from the test site and dropped fallout on St. George, Utah, but the Commission reported that the maximum radiation level was no more than 0.026 reontgen (R) per hour, or far below the guidelines set for off-site exposures. Nancy, the second shot, was somewhat larger than Annie and apparently dumped substantial amounts of fallout in sparsely populated areas northeast of the test site. Because monitoring teams had been stationed only in communities and took only a limited number of readings along roads, it was impossible to know precisely what the radiation levels were in the hinterland. In its public releases the Commission merely reported that there had been no fallout in populated areas, although it was admitted that the small number of residents at Lincoln Mine, Nevada, had been requested to remain indoors for two hours while radiation from fallout exceeded 0.5R per hour. The third through the sixth shots produced no radioactivity that was measurable in inhabited areas.[16]

More radiation exposures, however, did occur during the high-yield shots that concluded the series. A wind shift at the time Simon was detonated on April 25 carried the radioactive cloud over two highways in Nevada. When fallout reached 0.46R per hour, Graves ordered roadblocks set up and about forty vehicles with interior readings of 0.007R per hour were washed at government expense.[17]

By far the most serious was the fallout from the Harry shot on May 19. Postponed three days because of unfavorable weather, Harry was fired under what seemed to be perfect conditions. But a wind shift and a slight increase in wind velocity spread fallout in a pattern about fifty miles square over populated areas east of the proving ground. For the second time in a month roadblocks were set up on major highways to monitor motor vehicles. At 9:10 a.m., about four hours after the shot had been fired, readings as high as 0.32R per hour were being recorded at the roadblocks. At that time Edward S. Weiss, the Public Health Service officer stationed in St. George, called the sheriff's office and radio station to warn people in the area to take cover. Local schools kept children indoors during the morning recess and the washing of contaminated cars in St. George was suspended. By 9:40 a.m. most of the population in St. George was under cover and the community came to a standstill.

The all-clear came before noon when the first officials from the test site arrived to look over the situation. Because of the understandable tension among the residents, Weiss was ordered to remain in the area for several more days. During that period he considered collecting milk samples from local dairies to check for radioactivity, but because of the uneasiness in the community, Weiss concluded that such a survey might create alarm. For that reason he limited his investigation to a few samples of milk purchased in local stores. From measurements at St. George the test group later estimated that the maximum amount of external exposure that could have been received at St. George was 6.0R and 5.0R at Cedar City. Scientists later estimated that children living near the test site received thyroid doses from iodine 131 ranging from the inconsequential to levels that might have caused some thyroid abnormalities.[18]

PUBLIC AND PRIVATE CONCERNS ABOUT FALLOUT

Although many people in these Utah communities were unnerved by the incident, they were reassured by statements from the test group that the radiation exposure had been below hazardous levels. Most people did not complain about having to remain indoors or waiting at roadblocks. There was neither public alarm nor open protest in the communities, but individuals did complain that fallout had caused physical injuries or disabilities. Only two very mild congressional inquiries resulted from the Simon and Harry incidents, and both of these took the form of requesting reassurance rather than registering a protest. In both instances, Commission officials and the test group were able to quickly convince the Congressmen that adequate precautions had been taken to assure public safety. Very few newspapers outside the immediate area covered the incidents, and most of these stressed the Commission's reassurances. Incomparably more troublesome were the deluge of letters and a flurry of newspaper and magazine articles speculating on whether the seemingly unusual number of severe tornadoes occurring across the nation that spring were caused by the Nevada tests. The Commission's public information staff was still answering tornado inquiries long after the fallout incidents had been forgotten.[19]

Public alarm had been avoided, but the Commissioners were privately concerned about the fallout from the larger shots in the series. On May 13, 1953, John C. Bugher, director of the Commission's division of biology and medicine, reported that the total potential integrated dose to inhabitants in thinly populated areas following the Simon shot had been as high as 10 roentgens. A new dimension to the fallout problem developed when a heavy rainout near Troy, New York, the following day delivered a potential integrated dose of 2 roentgens. The Commissioners expressed concern about the unexpected high yield of Simon (43 kilotons). Dean observed that there had been an understanding that high-yield shots would be fired outside the United States, but he admitted that the Commission had no firm criteria for deciding such issues.[20]

The Commissioners also received troubling reports that sheepmen who customarily wintered their herds north of the test site had encountered unusually heavy losses after trailing their sheep to an area west of Cedar City, Utah, for shearing during April. Losses ranged up to 30 percent for newborn lambs and 20 percent for ewes or mature sheep. Because the winter range had received substantial fallout from the Nancy shot on March 24, there was a possibility that radioactive fallout could have been a factor in the sheep deaths. Unfortunately most of the dead sheep had been disposed of before veterinarians and radiation specialists arrived on the scene, but many of the surviving sheep in the affected herds showed lesions on the face and back after shearing. State and local veterinarians were unable to diagnose the malady, and those from the Public Health Service and Los Alamos were not certain whether the lesions were caused by fallout. Arrangements were made to sacrifice some of the surviving sheep for detailed biological studies and further radiation experiments on sheep were started at the Commission's Los Alamos and Oak Ridge Laboratories.[21]

The fallout question became more pertinent the following week when the Commission considered a proposal to add an eleventh shot to the series. Design work had just been completed at Los Alamos on some new principles that would be used in the Castle series in the Pacific early in 1954 to develop a deliverable thermonuclear weapon. Because Los Alamos had completed this work earlier than expected, it would be possible to test the new principle at Upshot-Knothole

rather than in a special single-shot series in the Pacific in the autumn of 1953.

Testing the device in Nevada would have significant advantages over a Pacific test in terms of saving time and money, but the yield would be more than 60 kilotons, or about 30 percent greater than Simon. When Dean expressed grave concern about local fallout or more distant rainout, Graves could give the Commission only partial assurances. First, Simon had made possible a more reliable estimate of yield. Second, the proposed test would be an air-drop rather than a tower shot, a factor that would greatly reduce fallout. Third, because it would be the last shot in the series, the test group could afford to wait for the best possible weather conditions.[22]

The Commission approved the eleventh shot on May 18, but the decision was clouded in uncertainty the following day when the first reports of fallout from Harry were received in Washington. Zuckert immediately requested a statement of the weather criteria that would be considered the minimum acceptable for the eleventh shot and raised the whole question of the test policy at the Nevada site. He considered the fallout from Simon and Harry as posing "a serious psychological problem" that would require the Commission to consider alternatives to continental testing. Zuckert also noted that the Commission's request to the President for authorization to use additional fissionable material for the eleventh shot had not alerted Eisenhower of the magnitude of the shot or the possible dangers involved. At Zuckert's suggestion, Dean discussed these considerations with Strauss at the White House. Strauss expressed greatest concern over the possibility that heavy fallout or rainout might jeopardize future testing in Nevada, primarily because he was impressed by the substantial advantages of conducting the test there. Strauss took the matter to Eisenhower, who with some misgivings approved the test.[23]

The eleventh shot, called Climax, fortunately performed close to predictions. Although the yield was 61 kilotons, offsite fallout was far below that of Simon and Harry and the test provided the information needed for the Castle series. These results, however, did not end the matter for Zuckert. The weather criteria which he had requested for Climax were vague at best and did not reach the Commission until the day after the shot. A week later Zuckert suggested the need for a full-scale review of "the highly interrelated public relations and safety problems that we have created" at the Nevada site. The committee appointed to study these problems should, in Zuckert's opinion, include experts in public information as well as in weapon and related technologies.[24]

THE QUESTION OF CONTINENTAL TESTING

To Zuckert and others the problems raised by the increasing size and number of Nevada tests were more of a public relations concern than a safety problem. This was not to say that safety was considered unimportant -- far from it. But safety could be managed by technology; public relations could not. Tyler, whom the Commission designated as chairman of the study group, followed Zuckert's lead in giving public relations a prominent place in the investigation. He invited Morse Salisbury, the Commission's director of public information, to serve as a member of the committee, and Richard G. Elliott, the Commission's public information officer at Los Alamos, had a key role as secretary of the committee. Other members included Bradbury and Graves from Los Alamos, Bugher on radiation matters, and veteran specialists from other government agencies on weather and blast effects.

Without any written instructions from the Commission, Tyler assumed that his job was to produce a more detailed study than the one completed in January

1953 and that any conclusions should be supported by comprehensive reports or documentation. To get the committee started, Tyler proposed that it examine a variety of questions under the general headings of the radiological problems of testing, both in the immediate test area and at greater distances; factors determining the amount of fallout; the blast and shock problem; the need for the continental test site; public education; and the kind of conclusions the committee should expect to reach. Elliott saw the task as one of supplementing the earlier report with Upshot-Knothole experience, preparing a definitive study of the value of continental tests, and recomterms of public safety and education. Much of the groundwork was to be covered by eleven studies assigned to committee members and others for completion in August 1953.[25]

By late September, the Tyler committee had unanimously concluded that a continental test site was necessary and that the Nevada Proving Grounds was still the best site available. The committee was also confident that operational controls at the site could be strengthened "to provide continuing assurance of public safety," and that a better education and information program was necessary.

One of the issues to be resolved before Nevada testing could be resumed was whether the Upshot-Knothole series had caused the sheep kill. Commission personnel at the test site were fully aware that the future of continental testing might hang on the results of the investigations already started. The studies completed during the autumn of 1953 concluded that neither the level of external radiation, nor radiation burns on the sheep's skin, nor radiation of the sheep's thyroid from iodine 131 in the fallout could have caused the deaths. The supporting data presented by the Commission's laboratories were impressive and seemed conclusive. It seemed much more likely at the time that the excessive number of deaths resulted from the extremely dry weather that left the herds badly undernourished that spring. Although the results were favorable, Commission officials in the field threw the best possible light on the findings, not only to show the general public that the tests could be conducted safely, but also to reassure the Commissioners, some of whom remained to be convinced.

When a group of sheep owners brought suit for damages against the government in 1955, the court found in favor of the government on the basis of the unanimous opinion of expert witnesses that there was no evidence that the fallout had caused the sheep deaths. Twenty-seven years later, however, in 1982 the same judge who had tried the original case vacated his decision on the strength of evidence that the Commission officials had perpetrated a fraud upon the court by suppressing the contrary opinions of some scientists.[26]

Although the point was not made explicitly, the committee's task had obviously changed from that originally conceived by Tyler. No longer was the committee expected simply to assess Nevada operations; the Commission now was demanding a solid justification for continental testing at the Nevada site. Personnel at the test site had been cut back to a skeleton force, and the Commission had refused to authorize any further construction until the Tyler committee had completed its report. To make certain that the committee's findings were fully documented, Tyler requested committee members and others to prepare additional reports and expand those already written. When completed in February 1954, the report consisted of a sixty-two page document backed up by twenty-five studies totaling more than 220 pages.[27]

Although the Tyler committee reaffirmed its September recommendation that tests be continued at the Nevada site, the report did propose certain restrictions on test operations. First, the committee set forth guidelines for justifying the need for shots, controlling or reducing fallout from potentially hazardous shots, prohibiting marginal shots under questionable weather

conditions, and imposing yield limitations on surface, tower, and airborne shots. Second, the committee proposed a "planning maximum" of ten to fifteen shots in one year at the Nevada site. Third, the committee advocated lowering the standard for offsite exposure from 3.9 roentgens over thirteen weeks to the same amount integrated over an entire year.

The Commissioners were inclined to accept all of the recommendations of the Tyler committee, but all but Murray wanted the views of the Commission's principal advisory committees before taking final action. Murray could see no reason to delay preparations for the next series at Nevada. Consideration by the advisory committees centered on the planning maximum. The advisory committee on biology and medicine favored a maximum of ten shots per year with no more than three high-yield tower shots. The general advisory committee, on the other hand, could find no sound reason for limiting the number of shots. A better approach, the committee thought, was to exercise the greatest precautions possible to protect test personnel and the public but to let operational needs determine the number of shots. Finally, on June 30, 1954, more than a year after Zuckert first raised the issue and on the last day of his term, the Commission approved the continuation of Nevada tests, subject to the restrictions proposed by the Tyler committee but without any limitation on the number of tests in any one year.[28] On this basis Tyler would make plans for the next continental test series in 1955.

RAW MATERIALS

Upshot-Knothole had helped to make nuclear weapons something of a reality for many Americans, particularly those living in the vicinity of the Nevada Proving Grounds, although the tests revealed almost nothing about the vast network of production and manufacturing plants that had been created to produce nuclear weapons. The far-flung complex of mines, ore processing mills, feed material plants, gaseous diffusion plants, production reactors, chemical separation plants, metal fabrication plants, and weapon component and assembly plants was still largely concealed behind the security barriers established by the Atomic Energy Act. Only cleared observers, and then only those with a real "need to know," were privy to concise information about the production chain.

Some of the most tightly held data related to the procurement of uranium ore. Production rates were top secret until mid-1953 and were available only to a few persons beside the Commissioners because the amount of uranium ore processed could be related in a rough way to the production of fissionable materials. Ore data were also considered especially sensitive in the early years because most of the uranium used in the American project came from overseas sources under secret agreements. Of the 3,700 tons of uranium concentrates (U_3O_8) which the Commission received in 1953, only about one quarter (1,100 tons) came from mines in the United States. The rest was produced in the Belgian Congo (1,600 tons), South Africa (500 tons), Canada (400 tons), and Portugal (100 tons). Another reason for secrecy was that successful accomplishment of the expansion program was heavily dependent upon the availability of sufficient ore to feed the production plants then under construction. The plants then in operation or under construction would require 9,150 tons of uranium concentrates per year when in full operation. Thus, 1953 receipts were less than half the amount ultimately to be required, and that goal was not expected to be attained before 1957, more than a year after all the plants were to be completed.[29]

These facts justified the high priority which the Commission put on ore procurement, but they did not tell the whole story. Prospects for new sources of ore were developing so rapidly that it was difficult to keep up with them.

As for foreign sources, the leveling off of production from the Shinkolobwe mine in the Belgian Congo would be more than offset by projections of rapidly increasing deliveries later in the decade from the Union of South Africa and Canada. South African concentrate production could reasonably be expected to rise to five or six thousand tons per year by 1960 as leading plants were constructed to process uranium in residues from gold mining operations in the Transvaal and the Orange Free State. Increased Canadian production was expected to come from new ore discoveries in northwestern Saskatchewan and northwestern Ontario.[30]

By far the most dramatic increase in concentrate production came from domestic sources in the western United States. In 1948 little over 100 tons of concentrates were delivered from domestic sources, principally from the Salt Wash member of the Morrison geologic formation in southwestern Colorado and southeastern Utah. By 1953 progressive exploration and Commission production incentives had extended the ore-producing area on the Colorado plateau to three times its original size and had led to the discovery of significant deposits in other types of geologic formations in New Mexico, South Dakota, and Wyoming. So rapidly had ore prospects improved in the western states that Jesse C. Johnson, the Commission's director of raw materials, was able to abandon earlier plans to extract very low-grade ore from Tennessee shales and Florida phosphates. Although hundreds of millions of tons of ore were potentially available from these sources, the concentrates would cost $40 to $50 per pound, compared to an average cost of $12 per pound of plateau ores.[31]

Uranium mining on the plateau, in fact, was taking on boom proportions which the newspapers found reminiscent of gold-rush days. As often happened in the mining industry, intense exploration resulted in discoveries of large deposits of relatively high-grade ore where only scattered, small deposits had been found before. The 1953 boom added the names of Charles A. Steen and Vernon J. Pick to the list of rags-to-riches legends in American mining history.[32]

With ore receipts approaching a half million tons per year in 1953, Johnson's highest priority was to see that mills were built fast enough on the plateau to process the ore into concentrates. All the mills on the plateau in early 1953 were privately owned except for the Commission mill at Monticello, Utah. The largest private mills, all in Colorado, were two operated by the U. S. Vanadium Company at Rifle and Uravan, two operated by the Vanadium Corporation of America at Naturita and Durango, and one at Grand Junction, operated by the Climax Uranium Company; Vitro Chemical Company also had a plant at Salt Lake City, Utah. These mills barely met 1953 requirements. Despite efforts to build new mills, specifically near the New Mexico discoveries, the Commission's ore stockpile grew to 775,000 tons by the spring of 1954, when ore was being delivered at a rate of 900,000 tons per year at an average grade of 0.30 percent U_3O_8. Ore deliveries, if not mill capacity, continued to outstrip requirements.[33]

The domestic procurement experience seemed to substantiate the position Commissioner Murray had consistently taken -- namely, that in searching for supposedly ever scarcer minerals, strong incentives for private industry often produced generous supplies. In July 1952 Murray had urged the Commission to establish a procurement goal of 12,500 tons of concentrate per year, or about 25 percent more than the 9,150 tons needed for all plants to be built under the expansion program. The Commission adopted the higher goal within a price ceiling of $25 per pound. As the Colorado uranium boom developed in 1953 along with prospects for much larger deliveries from South Africa and Canada, the Commission had no difficulty in raising the goal to 15,000 tons in April 1954. Five months later, the Commission could adopt a firm target of 17,500 tons per

year with a permissive target of 20,000 at a maximum price of $15 per pound. Continuing improvement in the raw material outlook was reflected in further increases in the procurement goal to about 25,000 tons in July 1955 and to 27,000 tons in February 1956. Even though projections for both civilian and military uses were still uncertain, there was growing confidence within the Commission that ore procurement would not inhibit future development.[34]

PRODUCTION PLANTS

The increasing amounts of uranium concentrates being delivered in the mid-1950s provided feed for the growing network of facilities that produced plutonium, uranium 235, and other materials for nuclear weapons. During most of this period the concentrates delivered from domestic and foreign sources were reduced to uranium metal at the Mallinckrodt Chemical Works in St. Louis, Missouri, or at the Feed Materials Production Center, a new facility which the Commission had constructed at Fernald, Ohio, near Cincinnati. Slugs of metallic uranium were shipped to Hanford, where they were welded into aluminum cans and inserted in the six plutonium-producing reactors in operation in early 1953. The much larger stocks of "virgin" uranium to be produced in the feed plants in subsequent years would serve as fuel for the new "Jumbo" reactors (KE and KW) at Hanford and for the five huge heavy-water reactors at Savannah River.[35]

Under the expansion program the increase in uranium-235 production was to be even larger than that of plutonium. Some measure of magnitude of the expansion could be gained from the gigantic effort to construct new gaseous-diffusion plants for producing uranium 235. The original U-shaped building at Oak Ridge had been one of the largest industrial plants ever constructed in the United States. In 1953 the original facility was dwarfed by the construction of three much more efficient plants at Oak Ridge (K-29, K-31, and K-33). As the year began, the foundations for K-33 were completed. Roughly comparable in physical size to the Oak Ridge complex would be the gaseous-diffusion plants at Paducah, Kentucky, and Portsmouth, Ohio. Started early in 1951, the first unit (C-31) of the Paducah plant was in operation late in 1952, and the three other units were in various stages of construction. Site studies had just started for the three big units at Portsmouth.

Because of the severe shortage of feed materials, very little of the uranium hexafluoride to be processed in these plants would come from virgin uranium. Instead the Commission was forced to rely on the enormous quantities of slightly depleted uranium that would come from the Hanford and Savannah River reactors. Until recently all of the uranium removed from the Hanford reactors since 1945 had been stored in a chemical soup with a variety of fission products in huge underground tanks at Hanford. After years of plodding development by several laboratories, the Commission had placed in operation the Redox plant, which recovered uranium as well as plutonium from the irradiated fuel slugs at Hanford. Although Redox was theoretically capable of extracting uranium from material in the underground tanks, a solvent-extraction process using tributyl phosphate (TBP) as the solvent showed greater promise for this process. After a long series of construction delays, the TBP plant was just coming into operation early in 1953, and Redox was just approaching capacity operation.

The rapidly improving prospects for developing a thermonuclear weapon during the early 1950s stimulated interest in producing the materials that would probably be used in such a weapon, especially the heavy isotopes of hydrogen: deuterium and tritium. The Commission already had an impressive production capacity for deuterium in the heavy-water plants at Dana, Indiana, and Savannah River, South Carolina, which had been built to supply moderator for the production reactors at Savannah River. Tritium, a radioactive isotope with a

relatively short half-life, did not ordinarily exist in nature and had to be produced by irradiating the light element, lithium, in a production reactor. Although both the Hanford and Savannah River reactors would be capable of producing tritium, their use for this purpose would reduce their capacity for plutonium production. Unless additional reactors were built, the Commission would have to balance its needs for plutonium and tritium.

There was another approach to the thermonuclear weapon that could conceivably reduce the demand on reactor capacity for tritium production. This was the idea, first discussed at the Princeton conference in 1951, of placing lithium in the weapon itself and using fission neutrons to produce tritium in place. For this purpose, however, it appeared necessary to use the lighter isotope of lithium, which made up only 7 percent of the element in nature. In 1949 there had been some interest in separating the lithium isotopes, not for lithium 6 but for lithium 7, which had some attractive properties for use as a reactor coolant and moderator. Preliminary research on methods of separating the lithium isotopes was thus available at Oak Ridge in 1951, when the Los Alamos laboratory first requested a small amount of highly enriched lithium 6 for thermonuclear research. This material was produced with the old electromagnetic equipment which had been built at Oak Ridge during World War II. The gross inefficiency and high cost of this operation, however, prompted the development of a better method, for which an electric exchange process was selected. Elex, as it was called, consisted of large shallow trays in which mechanical agitators mixed an amalgam of lithium and mercury with an aqueous solution of lithium hydroxide. After counter-flow through a series of stages, the lithium 6 tended to concentrate in the amalgam while the lithium 7 could be extracted by electrolysis from the hydroxide solution. Chemical reaction between lithium and water was prevented by placing anodes in the hydroxide solution and using the amalgam as a cathode.[36]

Although Oak Ridge had nothing more than laboratory data on the Elex process, the urgent need for lithium 6 for the thermonuclear program led the Commission in August 1951 to approve construction of a small plant to be in production by the autumn of 1952. Within a matter of weeks, however, this plan was overtaken by Los Alamos research which suggested the possibility of a "dry" thermonuclear fuel using lithium deuteride. Late in September 1951 Oak Ridge had a new requirement for an Elex plant with twice the capacity of the original plant, to be producing lithium deuteride by September 1953. Top priorities and special effort brought the first half of the plant into operation on August 14, 1953, the second half coming into operation a month later.[37]

DRIVE FOR THE HYDROGEN BOMB

The steadily increasing tempo of the Commission's production and construction activities reflected in large part the ever-growing sense of urgency to achieve an operational hydrogen bomb. A formal military requirement laid down by the Joint Chiefs of Staff in June 1952 called upon the Commission to produce a thermonuclear weapon in the megaton range that would be compatible with delivery systems to be available in 1954.[38] There were two ways of approaching that goal. One was to develop a very large fission weapon using substantial amounts of thermonuclear fuel. Before the Mike shot in November 1952, this "semi-thermonuclear" weapon seemed the shortest and surest route to the formal requirement, but it offered no other advantages. Besides being a very large and heavy weapon, it did not seem to point to promising avenues of future development. The second approach was the "true" thermonuclear weapon. Because it depended on a radical new design using the Teller-Ulam principle, it involved more risk than the "semi," but it opened a wide range of possibilities

for thermonuclear designs, including weapons much smaller than the "semi" on the one hand or very much larger in yield on the other.[39] Either approach seemed amenable to "wet" or "dry" thermonuclear fuels.

Important as Mike was in verifying the Teller-Ulam principle, it was not the key to reaching the military requirement. Mike and other experiments conducted during the Upshot series merely increased the probability that the "true" weapon would work. The actual testing of models that could be turned into weapons would come in Operation Castle, originally scheduled for the autumn of 1953. To meet the military requirement on time, it seemed that Castle could be no later than that. The schedule would also have made it possible to use elements of Joint Task Force 132 under Major General Percy W. Clarkson, which had conducted the Ivy series in 1952, to provide the logistics and support operations for Castle.

PLANNING FOR CASTLE

The stunning success of the Mike shot resulted almost immediately in postponing Castle until early 1954. The postponement opened the opportunity to conduct in the Upshot series further experiments that would contribute directly to Castle. The delay also assured the availability of more lithium 6 for Castle devices and moved the tests to the late winter and spring, when favorable weather conditions were more likely in the central Pacific. The one disadvantage was that the military services would have to disband some of the support units at Enewetak and then assemble new teams for Castle.[40]

Long before Mike and the change of schedule, however, plans had been laid for a major revision of testing procedures in the Pacific. Mike would merely confirm what Alvin C. Graves, the scientific test director, and others at Los Alamos had already concluded -- namely, that thermonuclear shots in the megaton range were too powerful to be conducted at Enewetak without threatening the extensive facilities that had been constructed there for earlier tests. Mike had destroyed an entire island in the Enewetak atoll and had damaged facilities on other islands. With the much larger tests contemplated for Castle, even the permanent facilities at the southern rim of the atoll would be threatened by thermonuclear tests on the northern islands. After considering several alternatives, Graves recommended that most of the shots in the Castle series, specifically the large thermonuclear tests, be conducted at Bikini, some 180 miles east of Enewetak. Bikini, which had been the site of Operation Crossroads in 1946, was still uninhabited, but it offered no facilities that would be useful in 1954. Graves' plan was to keep the main operational base for Castle at Enewetak, where the low-yield tests would be conducted. For the large tests at Bikini it was necessary to construct only a tent camp for construction and test personnel, a power plant, and a runway for small cargo planes. The two atolls would be linked by aircraft, ships, and radio and telephone communications.[41] In a sense one could say that nuclear weapon technology had now reached such colossal dimensions that a test site more than 180 miles wide was required.

The unprecedented radioactive fallout during the Upshot-Knothole series, the public anxiety about the possible effects of testing on weather, and the Eisenhower Administration's interest in budget stringency all combined to prod the Commission to reduce the number of tests scheduled for Castle. From the other direction, the Commission heard persuasive arguments from the weapon laboratories for at least six shots. Graves told the Commissioners on July 23, 1953, that there were compelling reasons for all six tests. The first three were high-yield shots necessary to assure an emergency capability with thermonuclear weapons and would lead to weapons that could be carried in a B-36

bomber. The fourth, also high-yield but somewhat smaller in size and weight than the others, was intended for use in the new B-47 bomber. As a Los Alamos leader, Graves could vouch for the value of the first four high-yield shots, just as Herbert F. York and others at Livermore could speak for the need for the two low-yield tests, which it was hoped would open the way to thermonuclear weapons much smaller in size and yield than Mike.[42]

There were the usual discussions of the relative merits of the proposed shots with some agonizing over how many should be devoted to assuring an emergency capability and how many to developing new and more promising designs. Beyond these concerns was always the dilemma of substituting for the recommended shots one or more highly experimental tests with new designs that might easily fail but that might also provide a giant step forward in weapon technology should they prove successful. Strauss asked Graves how long the Commission could postpone the decision without jeopardizing the February 15 date for start of the Castle series. Graves suggested the middle of September.

By that time the Soviet Union had detonated Joe 4, an event that raised the level of anxiety and urgency within the Commission and the laboratories. When Kenneth E. Fields, the director of military application, presented the revised shot schedule on September 22, 1953, he noted the need for one substitution and a delay in starting the series until March 1, mostly because of a lag in construction at Bikini but also in order to ease the strain on logistics. Again the Commissioners struggled with the need to assure emergency capability with pedestrian but reliable designs as opposed to testing more risky but also more promising concepts.

NEW PRODUCTION REQUIREMENTS

A new issue appearing in September 1953 was the critical need for lithium deuteride and tritium. To the extent that any of the devices designed to provide emergency capability relied on large amounts of these materials, the less probable it was that the laboratories would meet the required stockpile dates. And beyond that point, there was still no positive assurance that a "dry" weapon would work. If the first test in the series, which was to be a "pure" weapon using lithium deuteride, should fail, the test schedule would have to be revised and the possibility would increase that Los Alamos would have to fall back for emergency capability on such unpromising systems as the weapon version of Mike with its great bulk and cumbersome cryogenic gear.[43]

Although the Commissioners were determined to give the highest priority to the emergency capability, they were also prepared to take a large risk that "dry" weapons would be successful, an assumption that dictated a much larger potential requirement for lithium deuteride than the recently completed plants at Oak Ridge would produce. To meet this prospective demand the Commission on September 30 authorized construction at Oak Ridge of a second plant, larger than the first, using a somewhat different process called Colex, which utilized counter-current exchange in columns. As officials in the Bureau of the Budget found out to their consternation, the Commission had approved the new plant simply on the anticipation of need and with no firm requirement from the Department of Defense. Instead of following usual budget channels, Strauss obtained the required apportionment of funds directly from Budget Director Dodge while Defense proceeded to draft the requirement.[44]

Formal statement of the higher requirement came from the Joint Chiefs of Staff on December 15, 1953. The Joint Chiefs expressed the opinion that Joe 4 threatened the "substantial lead in destructive capability" which the United States enjoyed over the Soviet Union. Because production of thermonuclear weapons was "the cheapest method to obtain high-yield weapons and more

destructive capability," the Soviet Union could be expected to pursue this course. Unless the United States substantially accelerated its schedule for producing thermonuclear weapons, the Soviet Union would obtain nuclear superiority by 1958.

In this dangerous situation, the Joint Chiefs saw only two solutions. The first was to build new production facilities at great expense or to shift production in order to increase the size of the thermonuclear stockpile more rapidly. The latter course seemed the better one to follow, although it would mean some reduction in requirements for fission weapons in the megaton range. Following this course the Joint Chiefs proposed new requirements for the composition of the stockpile which would allocate available production capacity mostly to high-yield thermonuclear weapons and low-yield fission weapons for tactical support, air defense, and demolition.[45]

Even before the Joint Chiefs sent the formal notification, the Commission's operating contractors were considering how best to meet the new requirements. It seemed likely that the military requirements could be met over the long range, but there were questions about the near term. With the existing reactors at Hanford and the new units just coming into operation at Savannah River it would be difficult to produce the large amounts of tritium needed for weapons in the proposed stockpile, but there were reasons to be hopeful. One was that new methods of loading the reactors would substantially increase production of either tritium or plutonium. The other hope was that the Castle tests might significantly reduce the amount of tritium required for each thermonuclear weapon.[46]

If tritium requirements could be reduced, the Commission would have more capacity at Hanford and Savannah River for producing plutonium, which would also be in short supply. Not only was plutonium needed for low-yield fission weapons but also for the fission component that would initiate thermonuclear reactions in the hydrogen bomb. The Commission's production staff undertook detailed studies to determine the optimum allocation of reactor capacity at both sites to tritium and plutonium formation.

Other nuclear materials needed to meet the new requirements from the Joint Chiefs would also be in short supply, but there were ways in which the Commission could close most of the gaps. The outlook for deuterium production was relatively good because the existing plants at Dana and Savannah River could produce all the heavy water required; but it would be necessary to enlarge the electrolytic plant at Savannah River and build a new one at Oak Ridge to extract deuterium from heavy water. Part of the near-term deficiency in uranium-235 production could be overcome by accelerating completion of the new gaseous-diffusion plants at Oak Ridge and Paducah. Beyond that, until the Portsmouth plant could be built, more production of uranium 235 could be accomplished only by feeding more uranium to the Oak Ridge and Paducah plants or by increasing the amount of electric power used to drive the compressors. In either case, the decision would rest ultimately upon how much the Commission was willing to pay for additional production. As for lithium 6, the expansion of the Oak Ridge facility authorized only a few weeks earlier would meet the Joint Chiefs' requirements if the amount of feed for one of the new Colex plants was increased.[47]

THE QUESTION OF RESPONSIBILITY

It did seem possible to meet most of the Joint Chiefs' requirements, and there was no sentiment within the Commission on December 23, 1953, to delay the immediate actions which General Manager Nichols proposed on an emergency basis. The letter from the Joint Chiefs, however, did raise some of the old concerns

about the nature and implications of military requirements, which the Commissioners had discussed many times over the preceding seven years.[48] Although Strauss favored quick action, he wanted to confirm his impression that the stockpile recommended by the Joint Chiefs was based on specific targeting plans and not just on their estimates of the Commission's ability to produce.

Zuckert, who remained unconvinced on this point, spoke at some length about the enormous destructive capability of the proposed stockpile, which he estimated would be equivalent to several billion tons of TNT by 1957. He posed the frightening possibility that by that time the United States might have the capacity to destroy the entire arable portion of the Soviet Union. Zuckert did not think the Commission should question military requirements on military grounds, but he believed that the Commissioners had an individual responsibility as civilian officials to make sure that the President understood the implications of a decision which clearly transcended military matters. The decision, in Zuckert's opinion, involved a determination by the highest civilian authority that the proposed size and composition of the stockpile were consistent with national objectives as well as military needs.

Although Strauss did not really question the validity of the requirements, he acknowledged the obligation to discuss the issue with the President. In addition to the points Zuckert had raised, Strauss shared with Smyth a concern about the potential hazards from radioactive fallout if military plans for using thermonuclear weapons were ever carried out. Early in February 1954 the Commissioners reviewed the entire proposal in detail and discussed its implications. As a result, the question was presented to Eisenhower in a joint letter from Strauss and Secretary of Defense Wilson, and the President signed a formal directive approving the decision on February 6, more than two months after Nichols had alerted the staff to prepare for the new requirements.[49]

BUILD-UP FOR CASTLE

Although the Commissioners did not begin to concentrate their attention on Castle until late in 1953, preparations for the tests had started more than a year earlier. On October 2, 1952, within weeks after the Commission had approved the Bikini site, the first contingent of thirty-nine employees of Holmes & Narver, Inc., the Commission's construction contractor at the Pacific Proving Grounds, landed on Bikini to begin site preparations. By the time the Ivy series began a month later, about two hundred were at work on the few essential facilities needed to accommodate air and sea transportation from Enewetak.[50]

As soon as the essential activities of Operation Ivy were completed early in 1953, General Clarkson established Joint Task Force 7, which included many components of the Ivy group, and began to build the complex of administrative arrangements that would enable the three military services to support the scientists in the Castle series. The first task was to reach agreement on the general conception of the operation. All of the high-yield tests would be conducted at Bikini, but the main base of operations would continue to be Enewetak. Activities at Bikini were to be limited to the minimum necessary to instrument and fire the devices. In fact, the devices themselves, with one exception, would not be assembled at Bikini but rather in the Enewetak Atoll. Placed on barges, the test devices would be towed to firing positions at Bikini.[51]

The plan reflected in many ways the incredible magnitude of the effects expected from large thermonuclear weapons. So enormous were the projected yields that it hardly seemed feasible to maintain habitable facilities at Bikini, even when the shots were fired on the opposite side of the atoll.

Secondly, experience with the Mike shot at Ivy made clear that the relatively small amount of land above sea level at Bikini would soon be destroyed if all future tests were to be land-based.

But the operation of the proving ground, which stretched over more than two hundred miles of open ocean, posed logistical and administrative problems for Clarkson and the Joint Task Force. Transportation requirements alone challenged the capabilities of the peacetime military services in moving thousands of personnel and tons of equipment between the atolls and between the islands comprising each of the atolls. Communication needs were equally demanding, not only in terms of installing telephone, cable, and radio facilities, but also in managing the networks. At Enewetak Island, which served as the base of operations, and Parry Island, where most of the test devices were assembled, the task force had to arrange for construction of machine shops, laboratories, warehouses, repair facilities, barracks, offices, and port facilities.

As in the Ivy series, Clarkson organized the Joint Task Force by task groups. The scientific task group (7.1) under William E. Ogle, a Los Alamos scientist, was responsible for all aspects of assembling, positioning, and firing the devices. The group also installed all related test instrumentation and managed the radiological safety program. Each military service operated as a task group. The Army group (7.2) was responsible for ground security and all base facilities at Enewetak. The Navy task group (7.3) provided security for the thousands of square miles of ocean within the danger area, operated the inter-atoll ship transport system, provided shipboard technical facilities, and moved the firing targets to Bikini. The Air Force task force (7.4) supplied aircraft for cloud sampling and tracking, technical photography, and weapon effects on aircraft. A major Air Force assignment was operation of a network of weather stations on islands in the central Pacific which reported, along with Air Force weather reconnaissance planes, to Weather Control at Enewetak. The Air Force task group also operated the inter-atoll air transport system and provided search and rescue operations. A fifth task group, not included in the Ivy operation, was staffed by Commission personnel from the Santa Fe operations office to supervise construction operations by Holmes & Narver.[52]

The unprecedented yields projected for some of the Castle shots were something the military task group could understand. Very early the Air Force task group concluded that the aircraft used in Ivy for sampling airborne debris from the detonations lacked the speed, range, and altitude capabilities needed to track and sample the downwind movement of particles from the Castle tests. The acquisition of suitable aircraft and the development of effective procedures for cloud sampling thus became matters of special concern. Both the Air Force and the Navy recognized the growing importance of accurate weather forecasting as the yield of the shots increased. Wind patterns, not only on the surface but at all altitudes up to 100,000 feet could conceivably carry clouds of radioactive particles over inhabited islands as far away as Enewetak or other islands in the Marshalls, where rainfall might cause substantial fallout. Despite extensive experience gained by the military weather services in earlier Pacific tests, the relative lack of good data, compared with those available for continental land masses, posed a special challenge for the weatherman.[53]

Likewise the military task groups had no trouble appreciating the security implications of an operation as big and as dispersed as Castle. Lacking the authority to censor mail or other private communications, the Joint Task Force recognized that it would be almost impossible to prevent some information about the tests from seeping to the outside world, despite extensive measures for indoctrinating personnel on the importance of security. The enormous magnitudes of the projected yields were in themselves a threat to security. The flash and

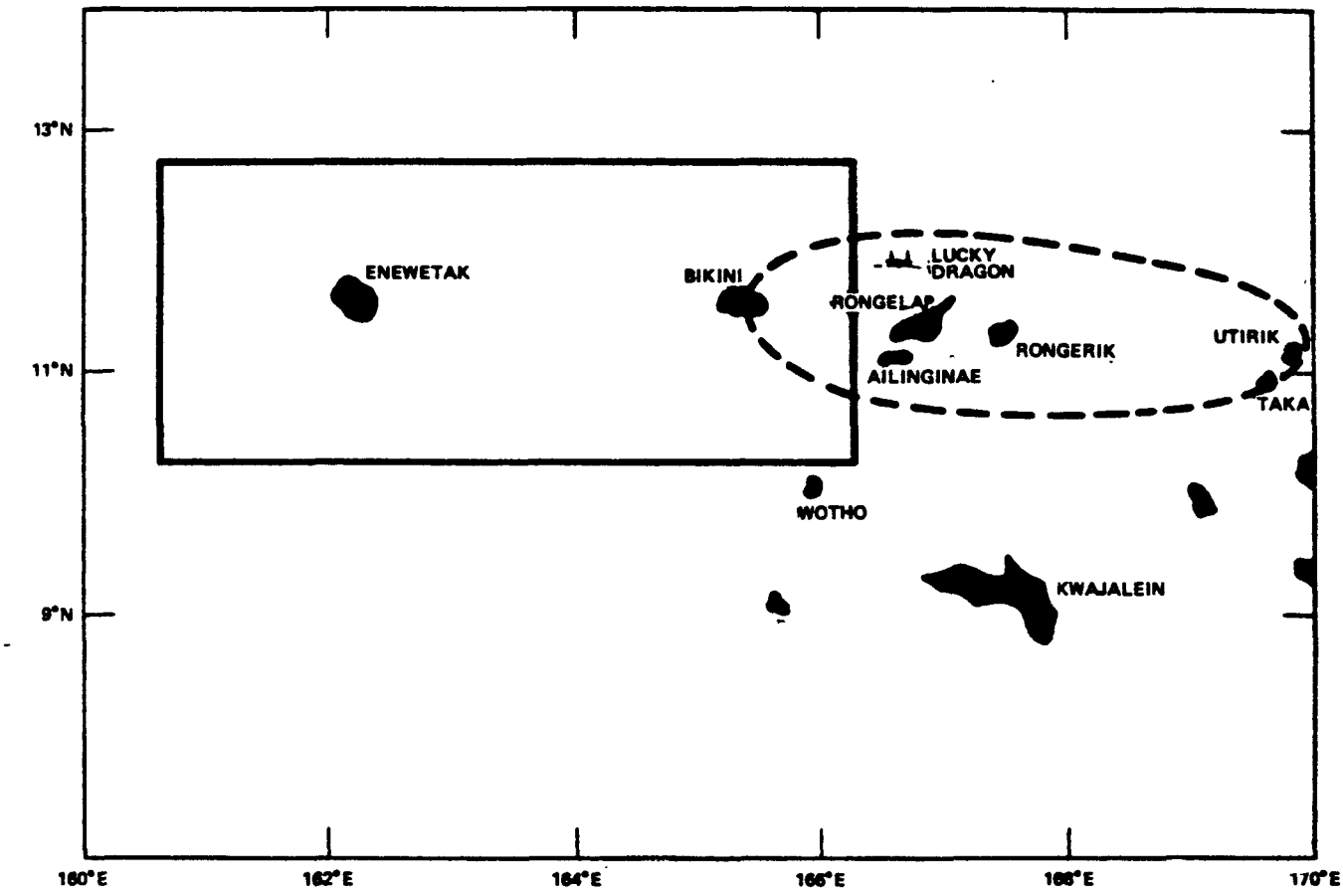
sonic shock wave might be observable fifty or more miles away and, depending on weather conditions, some fallout might occur at even greater distances. Samples of fallout material picked up by Soviet spy ships could reveal important information about the nature of the test. Thus it was deemed essential to conceal any information about the precise time or location planned for any test. It was also vital to establish an exclusion or "danger" area large enough to preclude obvious intelligence gathering by the Soviet Union or other nations.[54]

The military task groups, however, were less impressed with operational considerations posed by the less familiar characteristics of nuclear tests, specifically the dangers of radiation. Radioactive fallout was considered a potential but not very probable hazard beyond the immediate vicinity of Bikini. This attitude resulted from the Ivy experience, where extraordinary precautions were taken at considerable expense and to little purpose when virtually no local fallout occurred from the Mike shot. Graves and Commission officials had some difficulty convincing the military to make comparable plans for aerial surveys and emergency evacuation plans for Castle.[55]

The absence of any pressing concern about fallout was clearly reflected in the definition of the "danger" zone established for Castle. Obviously the Ivy exclusion area had to be enlarged eastward to include Bikini, but the question was how much further east it needed to be. Extending east and south of Bikini were two long chains of atolls that comprised the Marshall Islands. With unfavorable precipitation and wind patterns, significant fallout on some of these islands was theoretically possible. For that reason, the scientific task group intended to exercise every reasonable precaution within the limits of weather forecasting to see that radioactive debris from Castle shots would move in a northeasterly direction, away from Enewetak and the Marshalls. Recognizing the margins for error, the scientists insisted that the military services establish a capability for emergency evacuation of Enewetak and of the Marshall atolls immediately east of Bikini. The nearest of these atolls were Rongelap and Ailinginae, which lay scarcely more than fifty miles east-north-east of Bikini. If the exclusion area had been established with the fallout hazard as the primary concern, these atolls might well have been included within its boundaries. But in fact the eastern border of the exclusion zone was established, on the recommendation of the Department of the Interior, precisely to exclude the two atolls on the grounds that inclusion would require evacuation of the inhabitants for the duration of Castle. Thus the eastern boundary at 166° 16' east longitude was in effect fixed primarily for security reasons, and to that extent it was misleading to refer to the zone as a "danger area."[56]

By early 1954 more than ten thousand military and scientific personnel were pushing to meet the March 1 deadline for the first shot in the Castle series. Much of the activity related to the twenty experimental programs to be carried out with the detonations. Although many of these were directly related to weapon diagnostics, six of the experimental programs were sponsored by the Department of Defense and concerned weapon effects.[57] Actual assembly of the first device could not be completed until February 17, after the USS Curtiss arrived at Enewetak under destroyer escort with the nuclear components.[58]

The three military task groups conducted operational rehearsals during February, concluding with a general task force rehearsal on the morning of February 23. All task groups participated as fully as possible to test security and emergency evacuation procedures, the cloud sampling system, and communications. The scientific task group tested the readiness of instrumentation and



The Exclusion Area established for the March 1, 1954 CASTLE BRAVO shot did not contain the Marshall atolls east of Bikini. The dotted lines indicate the path of the fallout cloud. Also shown is the position of the Japanese fishing vessel, the "Lucky Dragon," at the time of the detonation.

firing circuits as far as possible. Ogle encountered several technical problems that would have aborted an actual detonation on that day. During the last two days in February, small craft began evacuating the last 1,400 workmen and technicians from the island camps at Bikini to ships in the lagoon, which then moved southeast about thirty miles from ground zero. All usable equipment had been moved south to Eninman and Enyu Islands so that it would be the maximum distance (about twenty miles) from the point of detonation. Only the firing party remained ashore, in a specially constructed bunker on Enyu.[59]

BRAVO

On February 22, 1954, the scientific task group under Ogle's direction completed the installation of the Bravo test device. Because it was to be the first shot in the series, the device had not been placed on a barge but in a small structure on a reef off Namu Island at the northwestern perimeter of the atoll. As the first test of a "dry" thermonuclear system, Bravo had special significance. Its performance would affect the subsequent agenda for Castle and could conceivably change the course of future development of thermonuclear weapons.

Once the final equipment checks were completed, the long countdown began to H-hour, at six-fifty-four, local time, on the morning of March 1. The actual firing time now depended mostly upon weather conditions, which in the central Pacific could change significantly from hour to hour. Clarkson, Graves, Ogle, and several other task group commanders attended weather briefings at midnight and at 0400 on the morning of March 1. There was little concern about precipitation because the forecasts called for a relatively light cloud cover and only widely scattered showers. The group gave more attention to the ever-changing complex of wind patterns at various altitudes. On the morning of March 1, surface and low-altitude winds were from the northeast while those above 20,000 feet tended to be from the west, a pattern that was almost typical. The variability and hence the cause for uncertainty lay in the wind pattern from 7,000 to 11,000 feet. At these altitudes the winds were light but they had a decidedly northerly component. The more northerly the wind vectors, the more likelihood there was that the radioactive cloud would pass over the inhabited islands east of Bikini in the northern part of the Marshalls. At the moment the weather picture seemed favorable if not ideal. In fact weather conditions had been near perfect on February 27 and had deteriorated only slightly since then. To postpone the shot might well have pushed the beginning of the Castle series into a decidedly unfavorable period with the possibility of a long and expensive delay. At the end of the four o'clock briefing, Clarkson and his advisors decided to fire Bravo on schedule.[60]

From the moment of firing Bravo gave every sign of being a spectacular success. Even the crudest, most preliminary measurements indicated a yield far greater than the six megatons estimated as the most likely figure. Other and more ominous indications of large yield were the surprisingly high levels of radiation recorded. Aircraft approaching Eninman Island a few minutes after the detonation recorded radiation levels that would preclude immediate reopening of the airstrip. A few minutes later the firing party in the control bunker on Enyu Island reported rapidly rising radiation readings even after the doors of the bunker had been closed. Before eight o'clock the Navy ships, which carried the shore personnel from Bikini and served as floating laboratories and offices in the lagoon, began reporting dangerously high radiation levels. The ships, already thirty miles south of Bikini, were ordered to head south at best speed

to a fifty-mile range, to activate washdown systems, and to use maximum damage control measures. Radiation readings on the decks were as high as 5 roentgens per hour with maximum readings of 25 roentgens in deck drains. Personnel were forced to stay below decks in the stifling heat for more than four hours, until fallout declined to safe levels.

The ships were then ordered to return within ten miles of Bikini but could not enter the lagoon because of high levels of radioactivity. The firing party had been evacuated by helicopter from Enyu, and radiation levels on Eninman were too high to permit landing on the island or operation of the airstrip. Extensive physical damage to the equipment stored on Eninman and to other facilities on the island showed the enormous destructive power of Bravo. Examination of test data gave a yield of 15 megatons, almost three times the most probable figure. Much more troublesome were the unexpectedly high radiation levels, which gave the Joint Task Force no choice but to double maximum permissible exposures of 3.9 roentgens for critical personnel such as helicopter pilots, flight deck personnel, and boatpool operators. Unable to enter the lagoon, the principal vessels of the Navy task group returned to Enewetak and prepared to resume operations at Bikini from a shipboard base of operations. Severe overcrowding of personnel on the ships, plus the unavailability of shore facilities, would hamper subsequent operations, but the earlier decision to use barge shots with instrumentation on buoys now seemed fortuitous.[61]

As radiation levels began to fall in the Bikini area late on March 1, reports of rapidly increasing readings trickled in from the atolls immediately to the east. These reports supported data collected by the Air Force cloud tracking teams that winds aloft were carrying the main body of Bravo debris in a direction just slightly north of east. As radiation levels climbed on March 2, the Air Force sent amphibious aircraft to Rongerik, 133 nautical miles from ground zero, to evacuate twenty-eight military personnel who manned the weather station and other scientific equipment for the Joint Task Force. Later the same day the Navy task group dispatched destroyers from Bikini to rescue native populations on other atolls. Early the next morning a beaching party went ashore at Rongelap, only about one hundred nautical miles southeast of ground zero. Within hours the islanders had gathered their personal belongings for what they believed would be a temporary stay at Kwajalein and boarded the USS Philip, where radioactive fallout was removed by washing. Later in the day another eighteen islanders were picked up at nearby Ailinginae Atoll before the ship proceeded overnight to Kwajalein. The second destroyer reached Utirik on March 4 and despite the heavy surf, the Navy transferred 154 islanders by life raft and small boat to the USS Renshaw.[62]

At Kwajalein military physicians examined the islanders and treated them for radiation exposure. When the people from Utirik showed no signs of radiation injury, they were transported to another island in the Marshalls, where they stayed until they returned to their home island in June. The people from Rongelap and Ailinginae were less fortunate. Because they had been much closer to Bikini than had those from Utirik, they had received much more fallout. Average readings at Rongelap were .375 roentgens per hour, while some soil samples were as high as 2.2 roentgens. Taking into account the length of time the islanders remained on Rongelap after the fallout occurred, radiation safety personnel computed that the islanders received a whole-body gamma dose of 175 rad on Rongelap, 69 rad on Ailinginae, and 14 rad on Utirik. As could be expected from such exposures, the Rongelap islanders developed low blood counts and suffered some temporary loss of hair, skin lesions, and hemorrhages under the skin. In terms of blood count, the islanders suffered about the same degree

of damage as did Japanese who were about 1.5 miles from ground zero at Hiroshima and Nagasaki. Equally distressing to the Rongelapese was that they were effectively exiled from their island home. Despite assurances of early repatriation, presumably by May 1955, the Rongelapese were not permitted to return to their home island until June 1957.[63]

THE LUCKY DRAGON

The final and in many ways the most telling radiation incident from Bravo was not discovered until March 14, when a Japanese fishing vessel, the Fukuryu Maru (or Lucky Dragon) No. 5 arrived in Japan with all twenty-three members of the crew suffering from radiation exposure. The ship's log and interviews with the crew indicated that the vessel had been about 82 nautical miles from Bikini at the time of the Bravo shot, or just beyond the eastern boundary of the exclusion area. The crew had seen the flash and heard the detonation. Although the fishermen suspected that the blast was a nuclear weapon test, they did not know that tests were scheduled at that time or that there was any danger from fallout. In fact, only after skin irritation, nausea, and loss of hair developed on the return voyage to Japan did some of the crew begin to guess that the white powdery substance which had fallen from the clouds like snow was radioactive. Fearing that they might be detained by the Americans or even that their ship might be sunk if their presence near Bikini was detected, the crew members decided to give no hint of what had happened until they returned home. By the time the ship reached its home port of Yaizu, the effects of radiation had become so prominent and irritating that several members of the crew reported to the local hospital. The two who appeared most seriously injured were taken to the Tokyo University Hospital and within a few days all the rest were in the hospital in Yaizu.[64]

The Commission in Washington first learned of the Lucky Dragon tragedy on March 15 from commercial news reports. Without waiting to consult Strauss, who had already left for the Pacific to witness the second shot in the Castle series, the other three Commissioners asked Nichols to provide immediate technical assistance to the American ambassador in Tokyo and to the Japanese scientists and physicians who were treating the fishermen. John J. Morton, director of the Atomic Bomb Casualty Commission in Hiroshima, arrived in Tokyo on March 18 by military plane with a team of doctors and hematologists who had extensive experience in observing radiation effects in Hiroshima and Nagasaki survivors. Radiation physicists provided by the U. S. Air Force joined the team in Tokyo. The team examined the two crewmen in the university hospital and compiled full clinical reports. The following week the team went to Yaizu, where they were permitted to board the Lucky Dragon, take some samples of fallout, examine some of the fish caught during the voyage, and use Geiger counters to measure radiation on the twenty-one crewmen in Yaizu.[65]

By this time the incident had received sensational treatment in the Japanese press. Yomiuri Shimbun, one of the largest Tokyo dailies, carried a series of frightening stories about "ashes of death." Another large Tokyo paper, Shukan Asahi, reported that the Japanese people were "terror-stricken by the outrageous power of atomic weapons which they [had] witnessed for the third time." Asahi editors speculated on the nature of the weapon tested and raised the possibility that the Americans had detonated a cobalt bomb, intentionally designed to spread poisonous radiation. Much to the discomfort of Strauss, Murray, and other security-minded Commission officials, Shukan Asahi also raised the possibility that a bomb using lithium had been tested.[66]

Although the Americans seemed sincerely to regret the incident and offered the Japanese full cooperation and assistance in treating the injured fishermen,

the Commission was deeply concerned about what the remaining traces of radioactive ash on the ship might reveal about the design of Bravo. The Americans were especially sensitive about any evidence that might suggest the success of a dry thermonuclear weapon. For this reason the Americans refused to provide any information about the design of the weapon or the content of the fallout. The Japanese were especially offended by this refusal because they believed that the fishermen had been subjected to a new type of radiation and that it would be impossible to treat their injuries adequately without this information. The Japanese scientists and physicians simply could not accept the assurances of American experts that this information was unnecessary.

In this atmosphere of suspicion, the initial Japanese willingness to cooperate with the Americans quickly evaporated. When Merril Eisenbud, director of the Commission's health and safety laboratory in New York, arrived in Tokyo on March 21, he was greeted courteously but was not permitted to examine any of the fishermen. Only after much persuasion was he able to obtain urine samples from some of the patients even after he had convinced Japanese physicians that the samples were essential in determining the amount of ingested radiation received. As the Japanese position stiffened, the Americans became more frustrated. They were convinced that the fishermen were not receiving the best possible treatment largely because, in Eisenbud's opinion, the Japanese did not wish to appear dependent on American help. The Americans were also disappointed that they were not permitted to make full biomedical studies of a group of people who had lived for two weeks in a high radiation environment. The Japanese, for their part, did not wish once again to be "guinea pigs" for American experiments.[67]

As the incident became a major issue in Japanese politics and continued to dominate the newspapers, the Japanese people reacted with an intense emotionalism. It was as if all the pent-up fears and anxieties engendered by Hiroshima and Nagasaki had suddenly burst into the open. For the third time in a decade Japanese civilians had been inflicted with the disfiguring and insidious injuries caused by nuclear weapons. The involvement of a fishing vessel was especially disturbing because it suggested that radioactive fallout from weapon tests might poison a major source of food for the Japanese people.

Both the State Department and John M. Allison, the American ambassador in Tokyo, at once sensed the full potential of the incident for damaging international relations. Allison had some success in conveying a sense of deep personal concern and in reassuring the Japanese government. He may also have been instrumental in keeping public criticism focused almost entirely on nuclear weapons while surprisingly little hostility was expressed against the United States. Within the Commission, however, there was much less evidence of compassion for the fishermen, and more concern about the security and scientific implications. Eisenhower refused to say anything about the Bravo shot at his press conference on March 17, but he promised to answer questions the following week.[68]

From Enewetak Strauss sent Hagerty a report on Bravo. The tests, Strauss reported, were routine but had been of great value and significance. The reports of radiation injuries to the Marshall Islanders were exaggerated, Strauss maintained, and claims about the fishermen were unverified. After describing how the danger area was established and patrolled, Strauss concluded: "The tests are continuing as planned." On March 24 the President relayed to the press only Strauss' statements about the exaggerated reports and deferred further comment until Strauss returned.[69]

After witnessing the second Castle shot, Strauss released a statement on March 31 summarizing unclassified portions of his report to the President.

Going back to the first Soviet atomic explosion in 1949, Strauss justified the tests as part of the nuclear arms race and then set about to correct "exaggerated and mistaken characterizations" of the tests by the press. Although the statement did serve that purpose, it was cast in cold, almost imperious language that tended to belittle the implications of fallout on the Marshall Islanders or the Japanese fishermen. One clearcut misstatement in Strauss' report was that the Lucky Dragon "must have been well within the danger area." All available evidence was and is to the contrary. That Strauss chose to reject evidence of the ship's true position probably reflects his conviction, conveyed privately to Hagerty, that the Lucky Dragon was probably a "Red spy ship." Similar suspicions expressed earlier in Japan by Congressman Cole had outraged the Japanese.[70]

COMPLETION OF CASTLE

For Clarkson and the Joint Task Force at Bikini the international implications of Bravo were more than overshadowed by the immediate logistical problems involved in completing the Castle series. The widespread devastation wrought by Bravo and the heavy fallout at Bikini required extensive changes in operational plans. Bravo had left Bikini all but uninhabitable so that logistical support and technical operations for the most part had to be based on Enewetak or on Navy ships assigned to Joint Task Force 7.3. The need to abandon even the limited base facilities at Bikini imposed a substantial transportation burden on shot preparations. Much of the equipment that had been stored on Eninman Island before the Bravo shot now had to be loaded on ships and transported to Enewetak.

The disastrous fallout following Bravo required the imposition of much more stringent weather criteria for later shots in the series with attendant costly delays. Romeo, the second shot, was scheduled after Bravo for March 13 but could not be fired because of unfavorable weather until March 27. Other shots in the series were also delayed as the frequency of favorable weather conditions declined during the spring. The exclusion area was greatly extended by adding a new sector centered on a point midway between Bikini and Enewetak and sweeping a huge semicircular area 450 miles in radius from west through north to the east. Both the new weather criteria and the expanded danger area recognized the unparalleled magnitude of both blast and fallout produced by thermonuclear weapons. The Nevada Proving Grounds, comprising about 500 square miles of desert, was a sizeable portion of the state, but it was miniscule compared to the exclusion area of 15,000 square miles at Enewetak for Operation Ivy. Then for Bravo the Commission had expanded the exclusion area to include Bikini and its size reached more than 67,000 square miles, or roughly the size of New England. After the Bravo fallout, the area was expanded to about 570,000 square miles, or twice the area of Texas. Thus, the testing of a single large thermonuclear weapon was beginning to require the exclusion of people from a significant portion of the earth's surface.

The most profound changes in Castle operations after Bravo resulted from the extraordinary nature of the technical information revealed by the tests. In addition to demonstrating the feasibility of a dry thermonuclear weapon, Bravo opened the way to other design improvements, of which the surprisingly high yield was only one indication. Following Bravo the sequence of shots was changed for a second time; some planned shots were canceled, and others were changed or added. Although such schedule changes in the middle of a series always introduced the possibility that some of the shots would not be used to the best advantages, the Los Alamos and Livermore scientists accepted the risk in order to capitalize on new opportunities for design improvement. As it

turned out, there were four shots following Bravo and Romeo: Koon on April 7, Union on April 26, Yankee on May 5, and Nectar on May 14.[71]

THE NEW REALITY

Long before Nectar was fired, both the laboratories and the Commission realized that Castle had surpassed the most sanguine expectations for the series.

Back in the autumn of 1953 the Joint Chiefs of Staff and the Commission had faced a given possibility of multiple failure. There had been no assurance that any of the shots would be successful. Even if some of them were, they might not be the devices that would provide an emergency capability in megaton weapons that seemed essential to national security in meeting the Soviet challenge. And even if by chance one of these devices offered that slim margin of emergency capability, there seemed even less chance that the Commission's production plants could turn out the special nuclear materials needed to meet stockpile requirements. For Strauss, Murray, Teller, and some of the Los Alamos scientists, the deadly race with the Soviet Union was very much in doubt. Possession of the hydrogen bomb alone could dangerously alter the balance in the Cold War.

But Castle changed all that. Even after Bravo, and certainly after Romeo, the future looked entirely different. It seemed that the American scientists had suddenly found the key to new realms of nuclear weapons. With a few notable exceptions, every new design principle incorporated in the Castle series seemed to work and often beyond the hopes of the most optimistic designers. By the time Castle was over, the United States had a choice of weapons for emergency capability. The feasibility of the dry thermonuclear weapon had been demonstrated so decisively that the Commission with confidence could cancel its contracts for cryogenics research for the "wet" device.

Equally important, the decision for "dry" weapons would immediately relieve the heavy pressure on the Commission's production complex. The plan to use a substantial portion of the neutrons in the Savannah River reactors for producing tritium could now be abandoned and that much more of the capacity devoted to plutonium formation. Castle also opened new possibilities for the more efficient use of all special nuclear materials, including lithium 6. Thus even a heavy dependence on "dry" thermonuclear designs did not severely tax the capacity of the Alloy Development Plant, which was already producing beyond its design specifications at Oak Ridge.[72]

The design concepts demonstrated in Castle opened the way not only to multi-megaton weapons of vast destructive capability but also to a whole "family" of thermonuclear weapons in a spectrum of yields, all the way from small tactical weapons to those matching the yields of much heavier and larger fission weapons already in the stockpile. In fact, Castle had rendered some stockpile weapons obsolete and seemed to be overtaking the utility of others. In explaining the significance of Castle to the general advisory committee on July 14, 1954, Bradbury went far beyond a description of specific design improvements. Castle, he said, had made possible a new philosophy for building the stockpile. Rather than trying to achieve a balanced distribution of yields, Bradbury wanted to concentrate on types in which large numbers of weapons would be needed and to develop the best possible weapons with optimum characteristics. This change alone would effectively enlarge the stockpile of ready weapons.

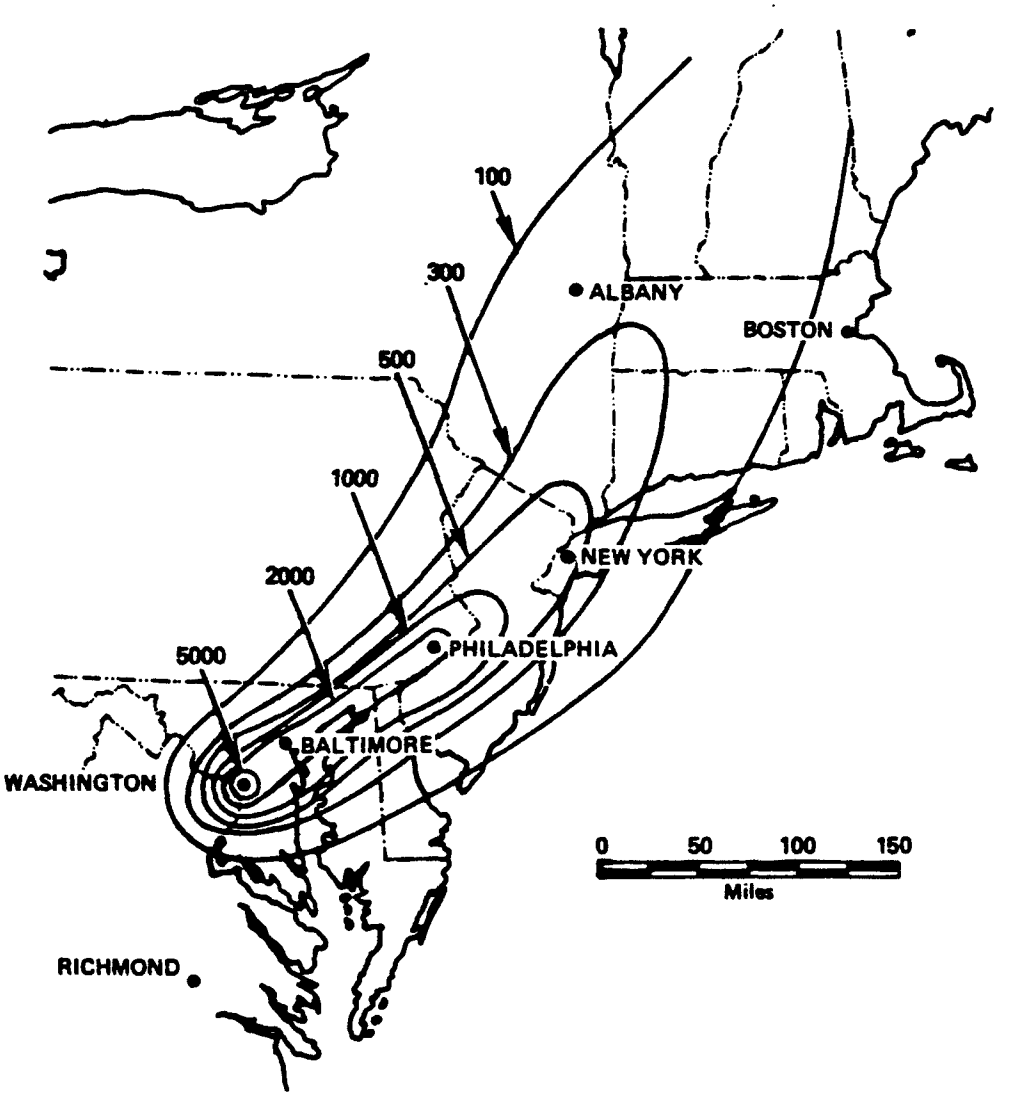
Isidor I. Rabi, the distinguished physicist who had replaced Oppenheimer as chairman of the committee, saw in Bradbury's remarks "a complete revolution" in nuclear weapons. Two years in the future, Rabi said, the stockpile would have little resemblance to what it had been two years earlier in 1952 before the Mike

shot. These sweeping changes in weapon technology, Rabi suggested, reflected a growing maturity that would require a more sophisticated use of systems engineering. In this respect, the Sandia laboratories operated by Western Electric at Albuquerque could make an important contribution. The entire committee agreed that the performance of the Los Alamos scientists at Castle had been outstanding. Committee members sensed an increasing feeling of strength and experience that had been missing at Los Alamos a few years earlier.[73]

As for Livermore, the committee saw in the new laboratory an exciting potential for the future, despite the fact that the Livermore shots planned for Castle had proved no more successful than those at Upshot-Knothole. Both Rabi and John von Neumann, the metamathematician, agreed that the Livermore scientists had done a remarkable job of diagnosing data from Castle experiments. Herbert F. York and the young colleagues he had helped recruit for the new laboratory were talented and energetic. They were purposely concentrating on the more difficult, high-risk designs that they hoped would quickly establish the laboratory's reputation as second to none, including Los Alamos. While York and his associates reveled in the freedom and informality they enjoyed under Ernest Lawrence's protection, the more experienced and conservative members of the general advisory committee were concerned about the lack of organization at Livermore. Although York was scientific director, the laboratory still had no formal head. Teller still wielded an enormous and stimulating intellectual influence in the laboratory, but he could not give it the kind of stable management which the committee thought it needed. York might be able to provide that stability, but he was young and relatively inexperienced. The committee hoped that the leadership question could be settled soon so that Livermore could reach its full potential.[74]

As results of the Castle series came in, the sense of accomplishment shared by the weapon laboratories and the Joint Task Force was certainly justified. The weapon devices themselves were evidence of exceptional scientific ingenuity and imagination. The successful conduct of the tests, despite the unexpected difficulties created by Bravo, were a tribute to all three military services under Clarkson's command. But Castle, like Upshot-Knothole, did taint the sweet taste of success with a sickening reality: mankind had succeeded in producing a weapon which could destroy large areas and threaten life over thousands of square miles.

In fact, the hydrogen bomb was so enormous in its destructive power that it defied human description. The general public caught some sense of this dimension at the conclusion of the President's press conference on March 31, 1954, when in response to a question, Strauss said that the bomb could be made big enough "to take out any city," even New York. The remark made headlines in the nation's newspapers. More precise descriptions of the bomb's destructive power were not possible in unclassified statements. Much more frightening was General Fields' statement on the fallout effects of Bravo at a Commission meeting on May 24. If Bravo had been detonated at Washington, D. C. instead of Bikini, Fields illustrated with a diagram, the lifetime dose in the Washington-Baltimore area would have been 5,000 roentgens; in Philadelphia, more than 1,000 roentgens; in New York City more than 500, or enough to result in death for half the population if fully exposed to all the radiation delivered. Fallout in the 100-roentgen area, which might have been roughly comparable to the Lucky Dragon exposures, stretched northward in a wide band through New England toward the Canadian border. This diagram was classified secret and received very little distribution beyond the Commissioners.[75]



Fallout pattern from March 1, 1954 CASTLE BRAVO detonation superimposed on the Eastern United States.

Even though they were not privy to this information, knowledgeable scientists did not fail to grasp the significance of Castle. Eugene Rabinowitch, editor of the Bulletin of the Atomic Scientists, saw an ominous warning in the Castle results, especially when they were placed alongside John Foster Dulles' enunciation of "massive retaliation" as a principle of American foreign policy only a few months earlier. Rabinowitch expressed his alarm "that statesmen (and ordinary citizens) discuss (and some of them advocate) 'massive retaliation' as an answer to local aggression, at the very moment when the Bikini test should have taught them that 'atomic retaliation' has become something no sane person should even consider as a rational answer to any political or military situation (short of direct Soviet aggression against the United States or Western Europe--if then)."[76]

For four years the hydrogen bomb had been the preoccupation of hundreds of American scientists and engineers. Now in the spring of 1954 success had come in almost too heady a form. And just behind it were the frightening problems--some that threatened human existence itself--created by that success. The Atomic Energy Commission, the United States, and the world truly faced a new reality in the technology of war.

NOTES

1. Newsweek, March 30, 1953, p. 31. Other reporters noted the same attitude among the troops: Robert Bennyhoff in Las Vegas Review-Journal, March 17, 1953, and Robert E. Baskin in Dallas News, March 22, 1953.

2. For earlier continental tests, see Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. II of A History of the U. S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), pp. 535, 563-64, 571 (hereafter cited as Atomic Shield).

3. Fields, Special Atomic Detonations for Weapons Effects and Training, AEC 487/2, Nov. 6, 1951; CM 624, Nov. 7, 1951; Fields to Dean, Jan. 3, 1952, with attachments, all in AEC.

4. The best reports on the diagnostic tests are classified. See Operation Upshot-Knothole, Report of the Deputy Test Director, Los Alamos Report WT-816, pp. 13-19; Summary of Upshot-Knothole Tests, June 4, 1953, both in AEC.

5. Goodwin, Description of FCDA Technical Program, undated but probably March 16, 1953; FCDA, Proposal for Civil Effects Test and Demonstration Program, June 1952, both in AEC.

6. FCDA, Operation Doorstep, published booklet, 1953.

7. There is an extensive collection of press clippings on this subject in DDE. The following are a representative sample: Life, March 30, 1953, pp. 24-25; U. S. News & World Report, March 27, 1953, pp. 38-40; Minneapolis Star, March 23, 1953; Providence Journal, March 17, 1953; editorials in the Philadelphia Inquirer, March 22, 1953, and the Washington Post, March 18, 1953, p. 12. On television coverage, see New York Times, March 18, 1953, p. 45 and Variety, March 18, 1953. Val Peterson's statement was issued in a FCDA press release, March 18, 1953, AEC. Eisenhower's endorsement is in New York Times, March 19, 1953, p. 1 and Public Papers of the Presidents of the United States, 1953: Dwight D. Eisenhower (Washington: Government Printing Office, 1960), p. 113.

8. AEC-DOD Test Information Office, Las Vegas, Background Information on Continental Nuclear Tests: The Spring 1953 Series, undated, AEC.

9. AEC-DOD Test Information Office, Las Vegas, A Fact Sheet on Continental Nuclear Tests, Jan. 14, 1954, AEC.

10. AEC, Thirteenth Semiannual Report (Washington: Government Printing Office, 1953), pp. 77-125 (hereafter cited as Thirteenth Semiannual Report).

11. Committee on Operational Future of NPG, Summary of Minutes, Jan. 14, 1953; R. E. Cole to Fields, May 8, 1953, with Report of Committee on Operational Future of NPG, both in AEC.

12. Estimated yields were noted in Proposed Program for Operation Upshot, AEC 487/28, Feb. 2, 1953, AEC.

13. Summary of Upshot-Knothole Tests, June 4, 1953, AEC.

14. AEC, Fourteenth Semiannual Report (Washington: Government Printing Office, 1953), p. 49 (hereafter cited as Fourteenth Semiannual Report). For a concise history of the development of radiation protection standards, see Lauriston S. Taylor, Radiation Protection Standards (Cleveland: CRC Press, 1971).

15. The pretest precautions monitoring system is fully described in Thirteenth Semiannual Report, pp. 96-112.

16. Test Director to Division of Military Application, March 18, 26, April 20, 27, May 9, 1953. These appear in AEC 487/45, AEC 487/46, AEC 487/50, AEC 487/52, and AEC 487/54, respectively, all in AEC. Richard G. Hewlett, "Nuclear Weapon Testing and Studies Related to Health Effects: An Historical Summary," in Interagency Radiation Research Committee, Consideration of Three Proposals to Conduct Research on Possible Health Effects of Radiation From Nuclear Weapon Testing in Arizona, Nevada, and Utah (Washington: National Institutes of Health, 1980), pp. 51-54, 78.

17. Operation Upshot-Knothole, Report of Deputy Test Director, Los Alamos Report WT-816, pp. 72, 78, 96-98.

18. AEC-DOD Test Information Office, Las Vegas, Press Releases 70, 71, 72, all on May 19, 1953, all in AEC. Weiss described his experiences in St. George in Transcript of Meeting on Statistical Considerations on Field Studies on Thyroid Diseases in School Children in Utah-Arizona, Dec. 3, 1965, pp. 3-5, Document 9735, PHS Archives. For another eye-witness account of incidents at St. George, see Frank A. Butrico to William Johnson, n.d., in House Committee on Interstate and Foreign Commerce, Subcommittee on Oversight and Investigations, Hearings on Low-Level Radiation Effects on Health, April 23-Aug. 1, 1979, Serial 96-129 (Washington: Government Printing Office, 1979), pp. 781-84 (hereafter cited as Radiation Effects Hearings).

19. Oliver Townsend to Trapnell, May 20, 1953; Dean Diary, May 21, 25, 1953; Senator Arthur V. Watkins to Dean, May 23, 1953, all in AEC; Washington Post, May 21, 1953; Baltimore Sun, May 21, 1953; New York Times, May 25, 1953. AEC files contain many letters of inquiry addressed to the President about weather effects -- e.g., L. D. Faunce to Eisenhower, June 11, 1953; Ruth M. Smith to Eisenhower, June 12, 1953, both in AEC. AEC received about 1,000 letters on weather effects. See Public Relations of Continental Tests, Sept. 23, 1953, AEC. On published articles, see U.S. News & World Report, May 29, 1953, pp. 43-44; Newsweek, May 25, 1953, p. 37; Newsweek, June 1, 1953, p. 23; Newsweek, June 22, 1953, pp. 28-29; U.S. News & World Report, June 26, 1953, pp. 50-66. AEC files also contain numerous Congressional inquiries. See Sterling Cole to Dean, June 10, 1953, and Dean to Cole, June 12, 1953, both in AEC 652/1, June 16, 1953, AEC.

20. CM 862, May 13, 1953, AEC. The local fallout figure was reported in Fourteenth Semiannual Report, p. 50. The potential integrated dose was the theoretical maximum exposure that an individual remaining in that area would have received in the first 13 weeks following the fallout. The amount actually received would depend upon whether individuals followed

precautions to avoid fallout. The rainout at Troy was reported on p. 52. See also Bugher to Fields, May 14, 1953, AEC.

21. Many of the documents in AEC related to the sheep losses have been published in Radiation Effects Hearings, pp. 679-91, 717-36, 752-75.

22. Director of Military Application, Proposed Additional Shot for Upshot-Knothole Series, AEC 487/55, May 13, 1953, and CM 863, May 18, 1953, both in AEC.

23. CM 864, May 20, 1953; Zuckert to Dean, May 20, 1953; Dean to Zuckert, May 27, 1953; CM 866, May 22, 1953; Dean Diary, May 25-26, 1953; Dean to Strauss, May 26, 1953; Dean to Lay, May 19, 1953; Lay to Dean, May 27, 1953; Dean to Cutler, June 1, 1953, all in AEC.

24. AEC-DOD Test Information Office, Las Vegas, Press Release 84, June 4, 1953; Meteorological Criteria for Test Detonations at Nevada Proving Grounds, AEC 652, June 4, 1953; Zuckert to the Commissioners and General Manager, June 9, 1953; Zuckert to Fields, June 18, 1953; Fields to Zuckert, June 23, 1953, all in AEC.

25. Tyler to W. L. Guthrie, July 22, 1953; Elliott to Committee Members, Aug. 10, 1953; Tyler to Committee Members, Sept. 14, 1953, all in AEC.

26. Radiation Effects Hearings, pp. 692-93, 698-705, 709-16, 737-51, 776-79; CM 888, July 15, 1953; Director of Biology and Medicine, Sheep Losses Adjacent to the Nevada Proving Grounds, AEC 604/3, Nov. 4, 1953; same title, AEC 604/4, Jan. 13, 1954, all in AEC; Bulloch vs. United States, 133 F. Supp. 885 (D. Utah 1955); Bulloch vs. United States, 145 F. Supp. 824 (D. Utah 1956); U. S. District Court for the District of Utah, Memorandum, Findings of Fact and Conclusions of Law, Aug. 4, 1982, DOE.

27. Tyler to Fields, Sept. 29, Dec. 21, 1953; Tyler to Committee Members, Oct. 19, 1953, all in AEC; Report of the Committee to Study Nevada Proving Grounds, Los Alamos Report SFO-LA-7 and 7A, Feb. 1, 1954, LASL.

28. Director of Military Application, Use of the Nevada Proving Grounds, AEC 141/22, Feb. 5, 1954; CM 962, Feb. 17, 1954; E. C. Stakman, chairman, ACBM, to Murray, March 25, 1954; GAC 39, March 31-April 2, 1954; I. I. Rabi, chairman, GAC, to Strauss, Apr. 9, 1954; Director of Military Application, Use of the Nevada Proving Grounds, AEC 141/25, June 24, 1954; CM 1012, June 30, 1954, all in AEC.

29. Progress Report to the Joint Committee, Nov. 1953, in AEC 129/54, Dec. 1, 1953, AEC. On the 9,150-ton goal and its relationship to projected procurement, see Dean to Executive Secretary, National Security Council, June 10, 1952, in AEC 359/13, June 12, 1952; CM 723, July 16, 1952; and J. C. Johnson to M. W. Boyer, Nov. 7, 1952, in AEC 359/22, Dec. 3, 1952, all in AEC.

30. Director of Raw Materials, Uranium Ore Procurement, Draft Report to the NSC, Aug. 3, 1953, in AEC 359/27, AEC.

31. On developments before 1953, see Atomic Shield, pp. 426-27. See also Johnson's remarks to American Mining Congress, Sept. 23, 1954, AEC.

32. Press reports on the Colorado boom and to some extent on foreign sources began to appear in 1953. See articles by Burt Meyers in Grand Junction Sentinel, May 17, 18, 1953; Edward Hughes on South African developments in Wall Street Journal, June 1, 1953; John Worrall on South Africa in New York Herald-Tribune, Sept. 6, 1953; Herbert L. Matthews on Canadian boom in New York Times, July 24, 1953; on Wyoming ore discovery, Washington Post, Oct. 25, 1953. Charles Steen told his story in American Weekly in Washington Times-Herald, Sept. 27, 1953, pp. 4-5.

33. AEC Progress Reports to the Joint Committee, Nov. 1952, Nov. 1953; General Manager's Monthly Reports to the Commission, Raw Materials, Jan.-May 1954, all in AEC.

34. Murray to the Commissioners, July 8, 1952, in AEC 359/14; CM 723, July 16, 1952; Director of Raw Materials, Actions to Increase Uranium Production, AEC 359/30, March 25, 1954; Director of Raw Materials, Uranium Procurement Goal, AEC 359/31, March 25, 1954; CM 972, April 1, 1954; General Manager, Uranium Procurement Goal, AEC 359/33, Sept. 2, 1954; CM 1025, Sept. 15, 1954; Director of Raw Materials, Uranium Procurement, AEC 359/37, July 28, 1955; CM 1113, July 28, 1955; General Manager, Uranium Procurement, AEC 359/40, Jan. 13, 1956; CM 1169, Feb. 2, 1956, all in AEC.

35. This and the following two paragraphs summarize information in AEC Progress Reports to the Joint Committee, June through Nov. 1952, Dec. 1952 through May 1953, and June through Nov. 1953; AEC Monthly Status and Progress Reports, Jan.-Dec. 1953, all in AEC.

36. The Princeton conference is described in Atomic Shield, pp. 542-45. Lithium Production Facility, AEC 458, Aug. 6, 1951, AEC.

37. CM 588, Aug. 8, 1951; Alloy Development Plant, AEC 458/8, April 3, 1952; CM 851, April 9, 1953; MLC 84, Aug. 27, 1953, all in AEC.

38. LeBaron to Dean, June 13, 1952, in AEC 493/4, June 17, 1952, AEC.

39. The quotation marks indicate that "true" and "semi" are not authentic terms but have been coined by the authors to protect classified information. For an authoritative but classified description of thermonuclear weapon technology, see Samuel Glasstone and Leslie M. Redman, An Introduction to Nuclear Weapons, WASH-1037, Rev., June 1972, pp. 100-141.

40. CM 776, Nov. 18, 1952; CM 793, Dec. 22, 1952; Operation Castle, Status of LASL and UCRL Programs, AEC 597/2, Dec. 10, 1952; MLC 75, Dec. 18, 1952; Operation Castle, AEC 597/4, Dec. 22, 1952; MLC 76, Dec. 23, 1952; all in AEC.

41. Graves to Clarkson, June 11, 1952; Tyler to Fields, Aug. 27, 1952; CM 746, Sept. 11, 1952; AEC Press Release 478, April 2, 1953, all in AEC. Mike is described in Atomic Shield, pp. 590-93.

42. CM 893, July 23, 1953; GAC 36, Aug. 17, 1953, both in AEC.

43. CM 917, Sept. 22, 1953; Draft Minutes of Executive Session, Sept. 23, 1953, AEC.

44. Revised Plans for ADP II, AEC 458/13, Sept. 22, 1953; CM 921, Sept. 30, 1953; CM 943, Dec. 2, 1953, all in AEC. Frederick C. Schuldt, Jr., to William F. Schaub, Sept. 16, 21, 1953; Schuldt to File, Oct. 20, 1953, all in BOB.

45. Arthur Radford, chairman, JCS, to Secretary of Defense, Dec. 15, 1953; Maj. Gen. James E. Briggs to Strauss, Dec. 16, 1953, both in AEC.

46. Modification of Loading in Hanford Piles, AEC 245/8, Aug. 18, 1953; CM 906, Aug. 20, 1953; Increased Capacity for Special Materials Production, AEC 458/23, Dec. 22, 1953; Program Reorientation to Meet New Military Requirements, AEC 706, Dec. 22, 1953, all in AEC.

47. Revised Program for Weapons Materials, AEC 706/2, Feb. 2, 1954, AEC.

48. For earlier instances of such discussions, see Atomic Shield, pp. 165-70, 559-72, 574-81.

49. CM 949, Dec. 23, 1953; CM 958, Feb. 4, 1954; CM 959, Feb. 5, 1954; Strauss and Wilson to Eisenhower, Feb. 5, 1954; Eisenhower to Strauss, Feb. 6, 1954, both in AEC 706/3, Feb. 9, 1954, all in AEC.

50. Detailed information on the planning and execution of Castle is found in Joint Task Force 7, History of Operation Castle, 1952-1954. Most of the Information is included in the unclassified version in AEC. The unclassified version is cited below as Castle History. On early work at Bikini, see pp. 6-9.

51. Castle History, pp. 12, 60-62.

52. Ibid., pp. 47-50, 64-88.

53. Ibid., pp. 54-56, 90-93. An excellent summary of Castle meteorology is found in Appendix A, Castle History, pp. 151-72.

54. Ibid., pp. 42-46, 79-80.

55. Bugher to Radford, Commander in Chief, Pacific, May 15, 1953, and Radford to Bugher, June 26, 1953, both in AEC.

56. Col. Vincent G. Huston, acting director, Division of Military Application, to Nichols, March 30, 1954, with attachments, AEC, fully documents establishment of the exclusion area.

57. Castle History, pp. 57-58.

58. Report of Commanding Officer, Task Group 7.1, Report on Operation Castle, Los Alamos Report WT-940, p. 63.

59. Castle History, pp. 118-20.

60. Col. H. K. Gilbert, commander, Hqs Task Unit 13, Task Group 7.1, to Distribution, May 12, 1954, AEC, includes charts and weather data used at the two weather briefings.

61. Castle History, pp. 120-23, 132; John C. Clark, "We Were Trapped by Radioactive Fallout," Saturday Evening Post July 20, 1957, pp. 17-19, 64-66.

62. Castle History, pp. 123-31.

63. Earliest computed doses received at the atolls (in roentgens) were: Rongelap 100-130, Ailinginae 80, Rongerik 40-98, and Utirik 17. Clarkson, Memorandum for Record, March 19, 1954, LASL. Estimates cited in text and published in 1975 were only slightly different from the figures. See Robert A. Conard et al., A Twenty-Year Review of Medical Findings in a Marshallese Population Accidentally Exposed to Radioactive Fallout, ERDA Report BNL 50424, Sept. 1975, p. 7. Director, Division of Biology and Medicine, Return of Rongelapese to Their Home Island, AEC 125/30, Feb. 6, 1957; CM 1267, Feb. 21, 1957; Morse Salisbury to the Commissioners, April 15, 1957; Fields to Carl T. Durham, July 18, 1957, all in AEC.

64. The most detailed account of the incident is in Ralph E. Lapp, The Voyage of the Lucky Dragon (New York: Harper & Bros., 1957), pp. 27-70. The ship's position at the time of the detonation, as reported by Lapp, was established in an aide-memoire from the Japanese foreign office. See Merril Eisenbud to Bugher, April 9, 1954, in AEC 730/3, June 10, 1954, and George V. LeRoy to Bugher, March 16, 1954, both in AEC.

65. New York Times, March 16, 1954, p. 19; Charter Heslep to Rodney L. Southwick, March 15, 1954; CM 967, March 16, 1954; State Department Telegram 2048 to American Embassy, Tokyo, March 16, 1954; State Department Telegram 2243, Tokyo to Secretary of State, March 18, 1954; Morton to Bugher, March 28, 1954, with attachment, Preliminary Medical Report on the Fukuryu Maru No. 5 Incident, all in AEC.

66. Yomiuri Shimbun, March 16, 18, 24, 1954; Shukan Asahi, March 17, April 7, 1954, and other translations of articles from the Japanese press in American Embassy, Tokyo, Daily Summaries of Japanese Press, microfilm in Periodicals Division, Library of Congress.

67. Eisenbud to Bugher, April 9, 1954, in AEC 730/3, June 10, 1954; Morton et al., Supplementary Medical Report on the Fukuryu Maru No. 5 Incident, April 19, 1954; Morton and Jack J. Lewis, The Relationship Between the American and Japanese Scientists During the Fukuryu Maru No. 5 Incident, May 27, 1954, all in AEC.

68. Public Papers of the Presidents of the United States, 1954: Dwight D. Eisenhower (Washington: Government Printing Office, 1960), pp. 320-21 (hereafter cited as Public Papers, 1954, Eisenhower). For an excellent analysis of American and Japanese attitudes, see Herbert Passin, "Japan and the H-Bomb," Bulletin of the Atomic Scientists 11 (Oct. 1955), 289-92.

69. Teletype, Nichols to Strauss, March 17, 1954; teletype, Strauss to Nichols, March 19, 1954, both in AEC; Public Papers, 1954, Eisenhower, pp. 346-47.

70. Strauss Statement, March 31, 1954, AEC. The statement was reprinted in the Bulletin of the Atomic Scientists 10 (May 1954), 163-64. Hagerty Diary, April 2, 6, 1954, James C. Hagerty Papers, DDE. For published excerpts from the Hagerty Diary, see Robert H. Ferrell, ed., The Diary of James C. Hagerty: Eisenhower in Mid-Course, 1954-1955 (Bloomington: Indiana University Press, 1983), pp. 40, 42.

71. Castle History, pp. 131-42. Technical aspects of the Castle shots are described in Report of Commanding Officer, Task Group 7.1, Report on Operation Castle, Los Alamos Report WT-940, AEC.

72. CM 971, March 30, 1954; MLC 97, March 31, 1954; Fields to Nichols, April 5, 1954; Commander, Joint Task Force 7, Final Report, Operation Castle, June 15, 1954; AEC Progress Report to the Joint Committee, June-Nov. 1954, all in AEC.

73. GAC 41, July 14, 1954, AEC. For a description of the Los Alamos program in 1954, see Bradbury to Fields, Dec. 11, 1953, AEC.

74. University of California Radiation Laboratory, Livermore, Key Personnel and Functions, July 24, 1953, AEC; York to J. J. Flaherty, Dec. 18, 1953, LASL.

75. Washington Star, March 31, 1954, p. 1; New York Times, April 1, 1954, pp. 1, 20; CM 990, May 24, 1954, AEC.

76. Dulles' statement on "massive retaliation" first appeared in Time, Jan. 25, 1954, p. 17. The full text later appeared in Vital Speeches 20 (Feb. 1, 1954), 232-35. A modified, more qualified article appeared in Foreign Affairs 32 (April 1954), 353-64. Rabinowitch's article appeared in Bulletin of the Atomic Scientists 10 (May 1954), 146-47, 168.

CHAPTER 7
NUCLEAR POWER FOR THE MARKETPLACE

In his testimony before the Joint Committee on July 31, 1953, Lewis Strauss was careful to avoid committing himself on any of the sticky issues arising from the development of civilian nuclear power and industry's potential role in it. In fact, Strauss told the committee, in the few weeks since he had become chairman, he had been able to do little more to prepare himself than to read portions of the transcript of the hearings which had begun on June 24 with Gordon Dean's farewell statement. The transcript presented new facts which, Strauss said, would cause him to approach the question of nuclear power with an open mind in the months ahead.[1]

Surely an open mind would be an asset in trying to cope with the tangle of policy issues which the sudden burst of interest in nuclear power had produced. If nuclear energy was no longer to be an isolated, esoteric technology but was to become a commodity in the American marketplace, significant adjustments had to be made in the Nation's organic law and economic policies. But even in the more limited sphere of developing and introducing the new technology itself, Strauss and the Commission faced an impressive array of imponderables.

Many of these questions were related to the process of technological innovation: how does one best go about introducing a new technology into society? A familiar problem for large manufacturers, the management of technological innovation was hardly a common function for federal officials, except in the area of regulation. The application of radio broadcasting as a new technology in the United States, for example, did not depend upon promotional efforts by the Federal Government although it did require federal regulation. The introduction of commercial air travel did require federal subsidies in several forms, but the technology itself was already in private hands. In the case of nuclear power, however, the entire technology was confined within the government in 1953. Thus, the Atomic Energy Commission faced an almost unprecedented situation in bringing nuclear reactor technology into the marketplace.

The Commission had already identified the principal vehicles of innovation. These included, first of all, the dissemination of technical information itself, a process that was severely restricted by classification rules and security procedures until the new atomic energy act became law in 1954. Secondly, the Commission had an obvious responsibility to build experimental power reactors and to perform basic research on potential reactor materials and nuclear processes in the national laboratories. Third, it was conceivable that the Commission might build a full-scale nuclear power reactor that would provide private industry with realistic data on operational performance and costs. Fourth, the Commission might offer to assist private industry in designing, developing, and constructing full-scale power reactors. Lastly, the Commission could provide incentives for completely independent projects by private industry to construct and operate nuclear power plants. Most of these incentives were made available in the Atomic Energy Act of 1954.

DISSEMINATING TECHNICAL INFORMATION

Ever since 1947 the Commission had been trying to establish effective channels for communicating technical data to private industry within the restrictions of the 1946 Act. Some of the earliest efforts, which involved clearing a few corporate executives for access to classified data, were too small to be effective; but by 1950 some useful data were reaching industry through the Oak Ridge School for Reactor Technology and the distribution of

were used to study the rate of distribution of common elements in the body; in cytology, to study the turnover of biochemical compounds in living cells; in metabolic studies, to measure protein synthesis with carbon-14-labelled amino acids. Tracers were also used in a variety of studies to measure the uptake and distribution of nutrients and other chemicals.

In devising new uses for radiation sources, scientists had also to give greater attention to radiation effects. For along with the therapeutic and diagnostic powers of radiation came many unknown effects on biological systems. From the earliest days of the Manhattan project, the study of radiation effects was closely tied to industrial safety in nuclear technology. After World War II studies were broadened beyond specific problems to include basic research on the biological effects of all kinds of high-energy radiation and scores of radioisotopes. In the early 1950s many animal studies were concerned with the gross effects of whole-body irradiation while in plant research scientists at Brookhaven and elsewhere measured the effects of exposing commercial plants to gamma radiation during the growing cycle.

After the Upshot-Knothole and Castle weapon test series in 1953 and 1954, research on radiation effects began to focus on phenomena directly related to the biological effects of radioactive fallout. In addition to research on whole-body effects of external radiation, scientists began giving greater attention to the metabolism and toxicity of radioisotopes entering the body, particularly the most health-threatening products of weapon testing: strontium 90, cesium 137, and iodine 131. Animal experiments were conducted to measure the effects of radiation on blood platelets, blood clotting, and embryos as well as the effects on life expectancy and productivity. In plant studies biologists followed radionuclides from fallout through dispersion in the soil, to uptake by plants, and then to ingestion by animals and humans. In addition to these studies of somatic effects, the Commission also funded genetic studies in an attempt to relate radiation exposure to mutations in germ cells. The Commission continued to support, through the Atomic Bomb Casualty Commission, studies of the only large human population exposed to heavy amounts of radiation -- the survivors and offspring of Hiroshima and Nagasaki. The long generation span in humans, plus inevitable complexities in keeping track of large groups of individuals, made the studies in Japan difficult at best. To avoid some of these problems, the Commission funded genetic studies with mice, principally at the Oak Ridge National Laboratory, and with fruitflies at several universities.[58]

During the middle 1950s the Commission's budget for biomedical research hovered around $30 million per year. About a third of this amount went to studies of radiation effects; 28 percent to investigating beneficial effects of radiation; about 17 percent to research related to industrial health and safety; and about 7 percent to experiments on combatting the detrimental effects of radiation.[59] Most of this research was fundamental enough to attract the interest of scientists in a variety of research institutions, many completely outside the context of nuclear technology. Basic knowledge generated under research contracts could then be used by scientists in the Commission's laboratories in studies directly related to Commission programs. Before 1955 many of these studies concerned with the radiation effects of nuclear weapons were classified. Thus, as public concern over fallout hazards increased after 1954, it became difficult to evaluate the adequacy of the Commission's response. Critics could point to only nominal growth in the Commission's biomedical budget during the middle 1950s and to the fact that almost no funds were specifically earmarked for studies of the radiation effects of fallout. The Commission, however, could with some justification claim that the tens of millions of

dollars dedicated to basic research represented an effective and significant response to the fallout problem. It was also true after 1954 that much of the fallout research related to testing was charged to the budgets for weapons.[60]

GABRIEL AND SUNSHINE

Even more difficult for the public to appraise were the Commission's efforts to understand the larger implication of nuclear weapon testing and nuclear warfare. Obviously, estimates of the biological effects of fallout on large human populations were more likely to arouse fear and controversy than were small-scale experiments on laboratory animals. Thus it was not surprising that initial studies of large-scale effects were highly classified and unknown to the public. The Commission's division of biology and medicine first sponsored a macro-study in 1949, when one physicist at Oak Ridge undertook a theoretical calculation of the number of nuclear weapon explosions that would produce a significant radiological hazard. Revising his initial estimates in 1951 after the Ranger and Greenhouse test series, the scientist concluded that it would require the detonation of one hundred thousand weapons of the Nagasaki type to reach the "doomsday" level.[61] The likelihood of such an occurrence seemed so remote at the time that the Commission's biology and medicine staff could lightly give the study the code name "Project Gabriel."

The 1951 weapon tests and quick estimates by the headquarters staff, however, indicated that the short-term, close-in effects of a nuclear detonation could have serious consequences for a densely populated area. At the request of the general advisory committee, the Commission supplemented occasional staff work and laboratory studies on Project Gabriel with a Rand Corporation contract in 1952 to make a systematic analysis of the "intensive, short-time hazard to residents of areas relatively close to points under attack with near-surface bursts or air-bursts in rainy weather." At the moment the division of biology and medicine could find no contractor capable of undertaking a study of the long-term, widespread hazard.[62]

Within weeks after the conclusion of the Upshot-Knothole tests, which dumped significant amounts of fallout in localities beyond the Nevada test site, Willard F. Libby, at that time a professor at the University of Chicago and a member of the general advisory committee, called a classified conference of Rand personnel, scientists from the Commission's laboratories, and military representatives in Santa Monica, California. Libby noted that Rand had divided Project Gabriel into two distinct studies: the first directed at short-term, close-in consequences; and the second at long-term, distant implications. The first study, Libby admitted, had to remain secret because the revelation of data gathered within the first few days of a weapon test would reveal classified information about weapon design. The study of long-term effects, however, could be unclassified, and Libby argued that gathering fallout data on a national and perhaps a worldwide scale could best be done in the open. Long-term studies were essential, Libby believed, because growth of the stockpile and recent Nevada tests made clear as never before that strontium 90 could pose a serious radiological hazard for the public.

In the original Gabriel studies the principal focus of concern had been on the potential toxicity of plutonium disbursed as particles in the radioactive cloud. But since 1950 scientists had become more concerned about the possible effects of strontium 90, which behaved much like calcium in plant and animal chemistry; hence it tended to concentrate in the bone, where, with its 28-year half-life, it could cause bone cancer. Later Gabriel studies had used strontium 90 as the critical factor in determining the number of weapon detonations that constituted a radiological hazard. Not until the Upshot-Knothole tests in 1953,

however, was it evident that strontium could be widely distributed over the northern hemisphere, not only by nuclear war but also by fallout from testing. Knowing that all previous work on Gabriel had been secret or top secret, Libby faced a skeptical audience in arguing for an unclassified survey.

Commission officials attending the conference found Libby's ideas "stimulating" but not very practical. To single out strontium for special attention in an unclassified study might easily arouse undue public alarm, while the cost and complexity of a worldwide sampling project seemed too ambitious to undertake without further study. Libby was encouraged to begin limited sampling and analytical work in his Chicago laboratory, but no extensive project could be authorized until more data had been gathered. In the meantime Project Gabriel remained classified.[63]

Although the Commission did not move as far or as fast as Libby recommended, a substantial effort had been organized by the autumn of 1953. In addition to Rand's theoretical studies, scientists from the University of California at Los Angeles were continuing to study soils, plants, and small animals collected within a few hundred miles of the test site. Data were available from the fallout monitoring network of more than one hundred stations established for Upshot-Knothole. Libby and other scientists were already analyzing the strontium content of materials collected from widely scattered locations. Possibly to suggest that strontium 90 could be as widely distributed over the earth's surface as solar energy, Libby and his colleagues began referring to their work as Project Sunshine, a name that unfortunately implied in later years an attempt to put a "sunny" connotation on a somber and frightening subject. By the end of 1953 the Commission was supporting Project Sunshine at a level of 15 man-years and $140,000 per year. The division of biology and medicine estimated that it was also funding basic research related to Project Gabriel in about 70 projects costing $3.3 million per year. Although most of the basic research was unclassified, Sunshine and Gabriel were still considered secret.[64]

THE MULLER FIASCO

The Geneva Conference in the summer of 1955 offered a potential opportunity for open discussion of the radiation effects of fallout. The purpose of the conference, after all, was to afford scientists from many nations an occasion to exchange information and ideas on the peaceful uses of atomic energy. A preliminary agenda drafted in November 1954 included eleven papers on "medical and biological applications" -- six on the use of tracers, one on radiation use in medicine; two on its use in plant physiology and morphology, and one on its genetic effects.[65]

It was all but inevitable that any session on the genetic effects of radiation would include a paper by Hermann J. Muller, who had won the Nobel Prize in 1946 for his work on this subject. First developing an interest in genetics as an undergraduate at Columbia University in 1909, Muller had embarked on a productive career as a teacher and researcher at universities and research institutes in Texas, the Soviet Union, and Scotland, before going to the University of Indiana in 1945. Muller had startled the scientific world in 1927 with a paper describing experiments that proved it was possible to use radiation to induce mutations in genes. Always sensitive to the social and practical implications of his research, Muller never ceased before World War II to warn physicians of the genetic hazards of X-rays, although he believed that their therapeutic and diagnostic value was worth the risk if proper precautions were taken in using them.[66]

After the war Muller noted in several articles the potential genetic hazards posed by the atomic age, but his views did not attract widespread attention until April 1955, when he delivered a lecture at the National Academy of Sciences in Washington on "The Genetic Damage Produced by Radiation." The lecture caused alarm in government circles because it explicitly related genetic damage to nuclear testing and nuclear warfare and because Muller had already given a copy to the Bulletin of the Atomic Scientists for publication.[67]

Despite its bald title, Muller's paper must have seemed surprisingly moderate and judicious, especially to those who did not know his earlier publications. Muller challenged both those who discounted any genetic damage among the descendent populations of Hiroshima and Nagasaki and those who called, as he put it, "loudly, and in some cases in a suspiciously vitriolic tone, for an end to all nuclear test explosions, on the ground that even the tests are already seriously undermining the genetic basis of all mankind." Radiation, Muller admitted, did cause genetic damage, but he demonstrated that the potential effects of nuclear testing were exceedingly small and probably could never be traced to individuals. Much as he had done in warning physicians about X-rays, he urged great care to minimize radiation exposure from nuclear testing, but he took an unequivocal position that the national security requirements for nuclear weapons far outweighed the potential genetic damage of testing. Nuclear war would be a disaster, both genetically and otherwise, but nuclear testing seemed to Muller the best way to avoid it.

If Muller's lecture on the genetic effects of radiation upset some government officials, it did not seem to bother American scientists, both within and outside the Commission, who were planning the Geneva Conference. The Commission staff sent an abstract of Muller's paper to the United Nations early in May 1955, and the paper was promptly accepted for presentation at the conference. On June 6 the Commission's staff recommended that Muller be invited to the conference as a technical advisor to the American delegation. On that same day, however, perhaps as a result of the staff's action, steps were taken within the Commission to remove Muller from the invitation list. Circumstantial evidence suggests that Strauss made this decision on security grounds after talking with Bryan LaPlante and Charles Bates, the FBI liaison officer.

The problem was that Muller's FBI file bulged with derogatory data. He had been an active socialist during his youth in New York City. During the Depresssion of the 1930s he had openly espoused communism as the hope of the future. He probably had not ever been a member of the American Communist party, but he had been active in organizations sympathetic to the communist cause. He had spent almost four years at the Institute of Genetics in Moscow, had many Soviet friends, and had come home from Europe, according to FBI reports, with bundles of communist propaganda. The facts that Muller after World War II had bitterly attacked communism and the genetic theories of Lysenko and that he advocated continued nuclear testing as a necessary defense against Soviet aggression were perhaps discounted simply as a cover for his communist sympathies. As a result, the Commission asked the United Nations not to accept Muller's paper for oral presentation, although it was to be printed in the conference proceedings.[68]

Muller, who was already in Europe on vacation with his family and counting on the invitation to pay for his own travel expenses, could hardly have welcomed the rejection, but he made no open objection. He did, however, attend the conference at his own expense and sat silently as he received a standing ovation from the scientists attending the session at which he was to have presented his paper. The incident did not have reverberations beyond scientific circles until a month later, when a Washington Post reporter called the Commission staff about

the incident. A Commission press statement released the next day explained that Muller's invitation had been rejected because the full text of his paper "was belatedly found to contain material referring to the non-peaceful uses of atomic energy, namely, the bombing of the Japanese city of Hiroshima."[69]

This transparent explanation at once raised an outcry of protest among American scientists, some of whom demanded an investigation by the National Academy of Sciences. Strauss attempted to defuse the protest by claiming personal responsibility for rejecting the paper when he did not read it carefully under the press of business. The public impression, however, was that the Commission was attempting to suppress any discussion of the potential genetic effects of testing, no matter how balanced such an account might be.[70] The truth was that a reappearance of the Oppenheimer security syndrome supplied the compelling reason for rejecting Muller's presentation. The fact, however, that Strauss apparently acted within days after Muller's Academy lecture appeared in the Bulletin of the Atomic Scientists suggested that the popular conception was in part correct. The net result, as in previous instances, was further to destroy the Commission's credibility on matters relating to the radiation effects of fallout.

THE BALANCE SHEET

In the year following the adoption of the Atomic Energy Act of 1954 Strauss and other administration leaders enjoyed some success in promoting the peaceful uses of atomic energy. Most prominent on the Commission's list of achievements was the impressive array of activities to develop nuclear power for commercial purposes. The five-year reactor program in the Commission laboratories, augmented by the first two invitations to industry in the demonstration program, at least gave the appearance of a concerted effort to develop a new energy source. Even more remote, but perhaps of even greater ultimate promise than power from fission reactors, were the Commission's programs to harness fusion energy and to probe the mysteries of the atomic nucleus with high-energy accelerators. Of more immediate and direct benefit to society were the results of Commission-sponsored research in biology and medicine. The growing use of radioisotopes in both clinical therapy and diagnosis was already producing dramatic results in the treatment of cancer and other diseases. The Commission effectively presented all these benefits and achievements of nuclear technology, both in technical papers and exhibits, at the peaceful uses conference in Geneva in 1955; and the Commission hoped that they would be reflected in the report of the McKinney panel early in 1956.

Along with the benefits and accomplishments, however, came unexpected difficulties, disappointments, and public skepticism. For all Strauss' claims for the demonstration program, a practical nuclear power plant still seemed a long way in the future, and the American effort seemed to be lagging behind the British and the Russian. Strauss had yet to defuse growing congressional demands for a massive government program, and the bitter, seemingly endless controversy over Dixon-Yates threatened permanently to politicize the nuclear power program. For the moment the United States appeared to have the lead in the international race for fusion energy and in high-energy physics, but research in neither area as yet seemed to have any important applications in nuclear technology.

In the biomedical sciences, where the results of Commission sponsorship had been most impressive, impending consequences were also the most sobering. The very technologies that brought enormous benefits to human welfare also revealed previously unknown and unpredicted hazards. Commission-sponsored studies following the Upshot-Knothole weapon tests in 1953 showed conclusively that the

radiation hazards from fallout could be continental or worldwide. Research was revealing new and potentially serious hazards from internal emitters like strontium 90 and iodine 131 entering the human body through the food chain. Ironically, the ability to detect and measure such hazards came from research that had strikingly advanced knowledge of biochemistry in plants and animals. And just below the surface of public consciousness was the question of genetic effects, a subject politically so sensitive that even a world-renowned scientist could not approach it with impunity. Atomic energy did have peaceful applications; the question now was whether the accompanying disadvantages made it worth the effort.

NOTES

1. Draft policy statements for NSC Planning Board, Jan. 18, 24, 1955; NSC 5507, Jan. 28, 1955; CM 1055, Jan. 19, 1955, all in AEC.

2. Draft policy statement for NSC Planning Board, Feb. 24, 1955, AEC.

3. National Security Council, Summary of Discussion, Meeting 240, March 10, 1955, (hereafter cited as SNSC) DDE. The paper considered was NSC 5507/1, Peaceful Uses of Atomic Energy. There is no copy in AEC, but the Planning Board draft of February 24, 1955, in AEC is probably very close to NSC 5507/1. The paper reflecting NSC revisions was issued as NSC 5507/2 on March 12, 1955, AEC.

4. On Libby's earlier career in atomic energy, see Richard G. Hewlett and Oscar E. Anderson, Jr., The New World, 1939-1946, Vol. I of A History of the U.S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1962), pp. 99-100, 122-27 (hereafter cited as The New World); Richard G. Hewlett and Francis Duncan, Atomic Shield, 1947-1952, Vol. II of A History of the U.S. Atomic Energy Commission (University Park: Pennsylvania State University Press, 1969), pp. 486, 537, 562 (hereafter cited as Atomic Shield).

5. On von Neumann, see The New World, pp. 246, 313; Atomic Shield, pp. 176, 369, 439-41, 519, 529.

6. LaPlante to Strauss, Nov. 17, 1954; Strauss to von Neumann, Dec. 9, 1954; Strauss to File, Jan. 25, Feb. 12, 25, March 22, 1955, all in LLS; CM 1059, Feb. 5, 1955, AEC.

7. Joint Committee on Atomic Energy, Hearings on Development, Growth, and State of the Atomic Energy Industry, Jan. 31-March 3, 1955 (Washington: Government Printing Office, 1955), pp. 35-40 (hereafter cited as 202 Hearings, 1955).

8. Hafstad to Strauss, March 25, 1953; John J. McCloy to Strauss, Dec. 15, 1954; Strauss to McCloy, Dec. 16, 1954, all in LLS; AEC Press Release 582, Nov. 20, 1954, AEC.

9. CM 1055, Jan. 19, 1955; CM 1058, Feb. 1, 1955; both in AEC.

10. CM 1062, Feb. 23, 1955, AEC.

11. AEC Press Release 602, Feb. 25, 1955; AEC Press Release 648, June 17, 1955, both in AEC.

12. 202 Hearings, 1955, pp. 61-65.

13. Schuldt to Schuab, Bureau of the Budget, March 14, 1955; Schuldt to File, March 14, 1955, both in AEC; SNSC 242, March 24, 1955, DDE. Strauss' briefing notes for the NSC meeting are also in AEC.

14. Lay to Strauss, March 26, 1955; Davis to C. E. Nelson, April 5, 1955; Draft Report on An Analysis of Factors Involved in the Installation of a Nuclear

Power Reactor in a U. S. Merchant Ship, April 5, 1955; Final Report, April 7, 1955, all in AEC; SNSC 244, April 7, 1955, DDE; Lay to Strauss, April 9, 1955; CM 1074, April 11, 1955; AEC 653/3, April 13, 1955; CM 1075, April 13, 1955; Davis to Murray, April 15, 1955; CM 1077, April 27, 1955, all in AEC.

15. Hagerty Diary, April 25, 1955, DDE; CM 1077, April 27, 1955, AEC; Joint Committee on Atomic Energy, Hearings on Authorizing Legislation, FY 1956, May 2-31, 1955 (Washington: Government Printing Office, 1955), pp. 78-92; CM 1081, May 5, 1955; Libby to Strauss, Aug. 3, 1955, both in AEC; Richard G. Hewlett and Francis Duncan, Nuclear Navy, 1946-1962 (Chicago: University of Chicago Press, 1974), pp. 186-93 (hereafter cited as Nuclear Navy); Harold P. Green and Alan Rosenthal, Government of the Atom: The Integration of Powers (New York: Atherton Press, 1963), pp. 174-75.

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19. Director of Reactor Development, Report on Status of Small-Output Civilian Power Reactor in 10,000 KW Range, AEC 655/36, Aug. 18, 1955; CM 1120, Aug. 25, 1955, both in AEC.

20. Director of Reactor Development, Power Demonstration Reactor Program, AEC 777/14, Sept. 9, 1955; CM 1122, Sept. 14, 1955; AEC Press Release 695, Sept. 21, 1955, all in AEC.

21. Nelson, Analysis of AEC 655/39, Oct. 17, 1955; Nelson to Strauss, Oct. 17, 1955; Director of Reactor Development, Report on Status of Small Output Civilian Power Reactor in 10,000 KW Range, AEC 655/39, Oct. 17, 1955; CM 1139, Oct. 17, 1955; CM 1143, Oct. 26, 1955; Strauss to Lay, Oct. 26, 1955; Schuldt to File, Nov. 3, 1955; Nelson to Strauss, Nov. 15, 1955; Director of Reactor Development, Report on the Background and Status of the Small Output Civilian Power Reactor, AEC 655/42, Jan. 3, 1956; CM 1161, Jan. 5, 1956; Strauss to Lay, Jan. 6, 1956; Nelson to Strauss, Jan. 18, 1956; SNSC 276, Feb. 9, 1956; S. E. Gleason to Strauss, Feb. 13, 1956, all in AEC.

22. Aaron Wildavsky, Dixon-Yates: A Study in Power Politics (New Haven: Yale University Press, 1962), pp. 223-27 (hereafter cited as Wildavsky, Dixon-Yates); CM 1059, Feb. 5, 1955; News Bulletin, Feb. 1, 1955; Strauss to Gore, Feb. 8, 1955, all in AEC; Eisenhower press conference, Feb. 2, 1955, Public Papers, 1955, Eisenhower, p.230.

23. Wildavsky, Dixon-Yates, pp. 229-33; Congressional Record, 84 Cong., 1 sess., Feb. 18, 1955, pp. 1714-16.

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25. Ibid., pp. 233-39; R. W. Cook to Nichols, March 22, 1955, in AEC 385/80, March 31, 1955, AEC; Congressional Record, 84 Cong. 1 sess., June 16, 1955, pp. 8469-95.

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CHAPTER 10
THE SEEDS OF ANXIETY

From Bikini the remnants of the gigantic cloud generated by the Bravo shot had spread eastward, first over Rongelap, then on to Utirik and beyond, where white ashes fell like snow on the deck of the Lucky Dragon. A few hours earlier the same "snowfall" had silently descended on the unsuspecting islanders. Within a few days the United States Navy evacuated the men, women, and children, by now frightened and confused, from the islands and took them to Kwajalein for observation and treatment. In time many of them suffered the skin lesions and discoloration and loss of hair which scientists had come to identify with radiation exposure at Hiroshima and Nagasaki. For the crew of the Lucky Dragon, the name of their vessel belied its fate. Without troubling to remove the mysterious white ash for several days until it began to cause irritation and discomfort, the fishermen already bore evidence of substantial radiation exposure when their ship reached port. Stories of their diagnosis and treatment in Tokyo dominated the front pages in Japanese newspapers for weeks as the press described their disfigurement and suffering. As time passed, the superficial scars of radiation damage disappeared and most of the crew could return home. But not radioman Aikichu Kuboyama, who languished without appetite or spirit week after week. By the time Kuboyama died in late September, the Japanese had their own name for fallout. They called it Shi No Hai - "Ashes of Death."[1]

The introduction to the nuclear age experienced by the Marshallese and the Japanese fishermen represented an extreme but highly localized example of the anxieties that many people around the world would feel during the 1950s as they groped their way toward an understanding of nuclear weapons and their implications. For many Americans the stunning success of the atomic bomb in bringing a quick and merciful end to World War II engulfed concerns about the human toll in death and affliction. But the seeds of anxiety took root at Upshot-Knothole and began to flourish after Bravo. Scientists began to reexamine their earlier assumptions about the nature and significance of fallout and began gathering new data. Public officials, from Commission employees at the Nevada test site to the President in the White House, struggled to interpret the bloodless facts streaming in from the laboratories in technical reports and briefings. Politicians looked for ways to capitalize on the issues raised by fallout and testing while the public struggled to relate the controversy and growing anxiety to everyday life.

EVALUATING BRAVO

Following a visit to the South Pacific test site and a briefing on the Bravo shot, Congressman Chet Holifield felt compelled to convey his deep concern to the President. "I believe it is imperative," he wrote Eisenhower in March 1954, "that the people know the effect of these weapons in order that they may be able to more realistically evaluate the gravity of international tensions and the necessity of making the financial sacrifices necessary to protect our free way of life." Holifield's call for "plain words" rather than generalities or confusing scientific explanations arose from his assumption that the American people were "mature enough to accept an authoritative statement of the facts without panic or hysteria." He believed that the facts about the hydrogen bomb would lead to a "surging and irresistible demand for peace."[2]

The "facts" about the hydrogen bomb, however, were not that easy to relate. Security considerations aside, it was not just a problem of collecting and analyzing fallout data. The Castle test series had upset fundamental assumptions about strategy and civil defense, a basic fact that took some time to sink in. Just a few months before, in January, John Foster Dulles had given

his "massive retaliation" speech to the Council on Foreign Relations. Revised and qualified in the spring issue of Foreign Affairs, Dulles had outlined the basic defense policy expressed in NSC 162/2 which had formulated the "new look." Although not involved in developing the "new look," Dulles summarized the Administration's policy of relying upon rapid and overwhelming nuclear retaliation to deter or counter Soviet aggression against either the United States or its allies. Emphasizing collective security, the "new look," with its reliance on strategic thermonuclear weapons, was intended to meet the Soviet threat without seriously burdening the American economy. Yet the ink was scarcely dry on Dulles' Foreign Affairs article when the Administration was faced with nuclear tragedy in the Pacific without knowing exactly the consequences of the Castle/Bravo data.[3]

At his White House news conference on March 31, 1954, Strauss acknowledged the radiation injuries suffered by servicemen, the Marshallese, and the Lucky Dragon crew, but under questioning from reporters he also stated that the H-bomb could "take out a city" the size of New York. The fact that a nuclear bomb could wipe out a city, of course, was not new. Nevertheless, the New York Times understandably featured Strauss' devastating remarks and virtually ignored the fallout question. The fact that a thermonuclear bomb dropped on Washington might ravage the entire northeastern seaboard with radiation was still secret information.[4]

Meanwhile, on March 27, Eisenhower had set in motion the establishment of a special Technological Capabilities Panel to study the dangers of surprise attack. Although the study was not directly related to the fallout problem, Castle/Bravo no doubt reminded Eisenhower that the United States was vulnerable to sneak attack from a hostile, but closed, nation such as the Soviet Union. Thus concurrently with the Commission's fallout studies, the President asked James R. Killian, Jr., president of MIT, to evaluate through a comprehensive review of weapons and intelligence technology ways of avoiding surprise attack. The Killian Report to the NSC in February 1955 would conclude that both sides would be vulnerable to a surprise attack by thermonuclear weapons, although the panel expected the United States to maintain the upper hand until 1960. Thereafter, attack by either side with thermonuclear weapons would undoubtedly destroy more than cities or devastate regions; it would result in mutual destruction of the combatants.[5]

Even while tests continued at the Pacific Proving Grounds in 1954 there were hurried efforts to evaluate fallout data from Bravo. This task fell to the Commission staff and to scientists working with the Armed Forces Special Weapons Project, the Department of Defense organization with primary responsibility for managing the military aspects of nuclear weapon technology. Established in 1947, the special weapons project had succeeded the Manhattan District in overseeing weapon development and production for the Defense Department. Before the end of May the special weapons project sent the Department of Defense and the Commission an analysis of "Radioactive Fallout Hazards from Surface Bursts of Very-High-Yield Nuclear Weapons." Faced with an unprecedented and alarming situation, the Commission, the Federal Civil Defense Administration, the Department of Defense, and the Office of Defense Mobilization formed a special interagency task force to revise minimum standards for dispersal of new industrial facilities from the ground zero of potential targets. Prior to Bravo the standard had been ten miles. Had it not been for fallout, the federal government would have found it comparatively easy, albeit sobering, to recommend new industrial guidelines based on information derived from the Bikini tests. But tripling the radius to thirty miles would not compensate for a fallout cloud forty miles wide and two hundred miles long.[6] After reviewing the dispersion

standards on March 26, 1954, the President's Science Advisory Committee expressed its satisfaction with the study, but stressed that there could be no fixed standards for absolute safety. On May 26, however, when the Bravo implications were somewhat clearer, Arthur S. Flemming, director of the Office of Defense Mobilization, requested Strauss' advice on establishing new criteria.[7]

For almost four months Strauss did not respond directly to Flemming's request for help. Instead, during the intervening summer of 1954, the Commission studied the fallout problem and evaluated data which it shared with its own scientists and other agencies. Meeting at the end of May, the general advisory committee endorsed continued fallout studies, but also recommended that, when the fallout phenomenon was better understood, the public should also be informed of the facts. As Rabi's report to Strauss noted, it was hardly necessary to point out both the importance of, and the high degree of ignorance about, fallout from low-level thermonuclear bursts.[8]

During the months immediately following the Castle test series, the Commission was swamped with pressing problems of fallout evaluation, "clean up," and public relations. Through the torrid summer there was little time for calm reflection or plans for public education. There was no precedent, not even at Hiroshima or Nagasaki, for widespread contamination of human populations and habitats such as occurred after the Bravo shot. Data on acute or long-term radiation effects, both external and internal, on humans, pigs, chickens, dogs, coconut palms, papaya, tuna, and other flora and fauna were scarce or nonexistent. Immediate relocation and care for the sick Marshallese and negotiations with the Japanese government over compensation for the crew and owners of the Lucky Dragon were the major post-test concerns.[9]

A TEST MORATORIUM CONSIDERED

Bravo had also raised international issues. At the United Nations, the Soviet Union and India were pushing for a resolution to condemn the United States for testing in its Pacific trust territories. More astonishing, Commissioner Murray at home suggested the possibility of a comprehensive test moratorium. Initially, Murray raised the question on February 2, 1954, just a month prior to the Bravo shot, when he explained to Strauss and to the President that he had raised the issue "for discussion and exploration only" in response to Eisenhower's Atoms-for-Peace initiative. Following Prime Minister Nehru's public call for a test moratorium on April 2, Murray's tentative proposal could no longer be brushed aside. Subsequently, Albert Schweitzer and Pope Pius XII in his Easter message were among the prominent persons who expressed moral concern over continued testing.[10]

At the April 6, 1954, meeting of the National Security Council, Secretary of State Dulles slipped the President a handwritten note. "I think we should consider whether we could advantageously agree to Nehru's proposal of no further experimental explosions." The Secretary of State offered the President assurances that "this could be policed--or checked--." Eisenhower thought for a moment, and then launched his Administration's first exploration of the test ban idea by jotting in reply: "Ask Strauss to study."[11]

Six days later, in response to the worldwide expression of fear, but especially to Nehru's proposal, the United States Ambassador to the United Nations, Henry Cabot Lodge, asked Dulles whether the United States might agree to a partial moratorium on tests above one megaton.[12] Although there never was a serious possibility that the United States would suspend the Castle test series, the Murray-Nehru-Lodge proposals ultimately forced the President and the National Security Council to grapple formally with the issue.

On May 6, Dulles reported to the National Security Council that he had discussed the possibilities of a nuclear test moratorium with British Foreign Secretary Anthony Eden during the April talks in London. Dulles reflected that the United States ought to favor a moratorium on the grounds that the Castle series had placed the Americans well ahead of the Russians. Strauss agreed that the Castle tests were of upmost importance, but he expressed skepticism, which Secretary of Defense Charles E. Wilson shared, that the United States could satisfactorily police a test moratorium. Eisenhower countered that enforcement of the test ban was not a major issue. If the Russians violated a test ban, the United States could simply resume its own testing. More importantly, the President believed United States sponsorship of a moratorium would put the Soviet Union on the spot. Vice President Nixon concurred by noting that the Russians had a greater need to test nuclear weapons than did the United States. Consequently, the President directed Foster Dulles, Strauss, Allen Dulles, and Acting Secretary of Defense Robert Anderson, to report to the National Security Council on the possibilities for stopping or limiting atmospheric tests.[13]

Eisenhower's interest in a nuclear test moratorium, however, was not motivated simply by a desire to gain a propaganda advantage over the Russians. The President also fervently believed that it was wrong for the United States to take a negative view on "this terrible problem." Noting that the world faced a bleak future overshadowed by the hydrogen bomb, Eisenhower could not envision a long-term solution to the danger of nuclear warfare without first establishing a test ban.[14]

Unfortunately Eisenhower's pursuit of a nuclear test ban was shortlived in the spring of 1954. After a month of study, Dulles informed the National Security Council that his committee was virtually unanimous in opposing a nuclear test moratorium. The recommendation reflected the power of logic over the power of will, Secretary Dulles wryly observed, because all members of the committee had professed their desire to end testing. Strauss, for one, had advised Dulles that a moratorium on testing large weapons would be advantageous to the United States, provided a dependable agreement could be worked out with the Soviet Union. The trouble, of course, was that Strauss believed that a reliable agreement with the Soviets was illusory. Following advice which the Commission had solicited from Edward Teller and Norris Bradbury, Strauss warned that it was feasible to conceal a low-yield test. Also worrisome to the Commission would be the deleterious effect on the weapon laboratories of a long-term moratorium. Dulles observed that the United States would enjoy an advantage over the Russians only in the short run, but that after January 1956 American weapon development would have to be significantly curtailed.[15]

Eisenhower was genuinely disappointed that a nuclear test ban appeared unenforceable at the time. On May 25, the United States had introduced into the United Nations Disarmament Subcommittee a proposal to establish enforcement committees to oversee any disarmament programs. Subsequently, the United States also supported a French-United Kingdom proposal of June 11, 1954, which called for a phased approach to disarmament through successive stages and for nuclear disarmament phased with reduction of conventional armaments and forces. Although the President accepted the assumption that a test ban could not be effectively policed, he nevertheless categorically refused to link testing to an agreement on general disarmament. Putting the National Security Council on notice, Eisenhower informed his advisors on June 23 that if there were any way to negotiate an effective nuclear test ban or moratorium, he would do it.[16]

The gathering in the Red Room of the White House the following afternoon was unusually somber. Off by themselves, Strauss and Lord Cherwell were talking quietly. Surrounding the President and Prime Minister Churchill were Anthony

Eden, Dulles, and a few of the other guests who had attended the Sunday luncheon in honor of the British delegation. Churchill spoke at length and with great feeling about his fears for the future of the British Isles. He had been told that two or three hydrogen bombs could wipe out all the inhabitants of England, Scotland, Wales, and Ireland. After viewing the movies of the Ivy/Mike shot Churchill had ordered all work on air-raid shelters abandoned, on the basis that shelters would prove useless in a thermonuclear attack. Then reversing a position he had taken in Bermuda the year before, Churchill informed Eisenhower that the British would proceed to develop a hydrogen bomb.[17]

TOWARD AN UNDERSTANDING OF FALLOUT

The Oppenheimer case and the debate over the Atomic Energy Act left the Commissioners little time to reflect upon the larger implications of fallout during June and July 1954, but there was growing concern elsewhere in the government, particularly in the Federal Civil Defense Administration. Late in June Robert L. Corsbie, chief of the Commission's civil defense liaison branch, briefed civil defense officials on classified aspects of the fallout data collected at Bravo. For a second opinion the civil defense group turned to the Armed Forces Special Weapons Project. The staff of the special weapons group included a number of prominent scientists, among them Herbert Scoville, Jr., a physical chemist who had worked at Los Alamos for two years after World War II before going to the Pentagon. It was clear from the group's report that Bravo had introduced the world into a new era of nuclear weapons. Bravo represented as revolutionary an advance in explosive power over World War II atomic weapons as the Hiroshima weapon had over conventional bombs dropped in Europe during the war.

The enormous fallout pattern from Bravo, however, indicated that thermonuclear weapons were far more deadly as a radiation device than any explosive. Using fall-out patterns from Bravo, the group estimated that detonation of a 15-megaton weapon would deposit radioactive material in sufficient densities over a 5,000-square mile area to be "hazardous to human life. Indeed, if no passive defense measures at all are taken, this figure probably represents the minimum area within which nearly one hundred percent fatalities may be expected."[18]

The implications of Bravo reports were serious enough to warrant briefings of the National Security Council and the Joint Committee. Strauss took responsibility for the security council while Scoville briefed the Wedemeyer panel, which Congressman Cole had appointed to study the impact of nuclear technology on continental defense. The distinguished membership of the panel, which included Army General Albert C. Wedemeyer, Gordon Dean, and Charles A. Lindbergh, indicated the importance which the Joint Committee attached to the study.[19] The panel was greatly disturbed by Scoville's report on fallout effects and asked to what extent the American public and the world at large had been informed of the new data available since Operation Castle. Paul F. Foster, a retired Navy admiral and former business executive who had recently joined the Commission staff to assist the general manager on international matters, saw at once that the panel's concern would soon spread to the Joint Committee itself. Foster warned Nichols that, despite injunctions of secrecy, there would be leaks to the press from someone taking it upon himself[20] "to alert the public to the gravity of this, as yet unknown, danger."

No doubt anticipating problems from the report of the Wedemeyer panel, the Commissioners met twice in September with the Joint Committee to report specifically what fallout information had already been provided to the Federal Civil Defense Administration. During these same weeks Strauss and Nichols, now

convinced that a public statement was necessary, discussed how best to bring the matter before the National Security Council and the Operations Coordinating Board for a decision on issuing a full statement. Concurrently, the special interagency task force on dispersion standards, on which Foster represented the Commission, had been asked to develop a new policy on dispersion for recommendation to the cabinet. The task force completed its preliminary study in October.[21]

Speaking before an industrial health conference in Houston on September 23, 1954, John C. Bugher, head of the Commission's division of biology and medicine, presented the first public analysis of the medical consequences of thermonuclear warfare. Although Bugher minimized the effects of continued testing by estimating that fallout "would have to be increased by the order of 1 million times before an increased frequency of bone sarcoma from this cause could be recognized" in the United States, he candidly reviewed the awesome characteristics of the Bravo shot. After describing the elongated cigar-shaped fallout cloud that contaminated approximately 7,000 square miles in the Pacific, Bugher concluded that thermonuclear warfare would create unprecedented medical and social problems. Not only would the nation have to cope with blast and thermal casualties on a scale never before conceived of in warfare, but also, he warned, the radiological damage could create havoc far beyond the immediate attack zone. Although Bugher's speech received wide press coverage and was distributed throughout the United States by the Commission and the civil defense agency, its technical nature and guarded tone did not satisfy the increasing demands for public candor.[22]

On the day following Bugher's speech, Strauss finally answered Flemming's request for dispersion standards. Because it was impossible to predict what sort of weapon a potential enemy might develop within the next twenty years, for planning purposes the Commission estimated the effects of a 60-megaton weapon as suggested by the Defense Department. Strauss stated that a distance of twenty-nine miles from the perimeter of the target area should provide reasonable protection from blast and thermal effects. Twenty-nine miles, of course, would not offer refuge from lethal fallout of even a 15-megaton weapon. Unless fallout patterns could be immediately and accurately forecast and citizens warned, mass evacuation after a nuclear attack could easily catch refugees in the open where they could be least protected from exposure to radiation. The most effective measure, Strauss suggested, would be to take shelter in basements or underground structures for a few hours or days until radiation levels decayed sufficiently to allow safe evacuation under escort. Thus, no matter what the dispersion radius, sheltering rather than evacuation would be required to protect the population against residual radiation if critical industries were to continue functioning after a nuclear attack.[23] Obviously, public education on the effects of fallout would be required to win public support for a large-scale civil defense effort to build shelters.

On October 1, Willard F. Libby replaced Smyth as the principal scientist on the Commission. Soon he would become the Commission's chief spokesman on fallout. Twelve days after Libby's appointment, the Commission briefed key State Department personnel, including Gerard Smith, on fallout from the Bravo shot. Several of Smith's advisors were worried about the expected adverse impact which publication of fallout information would have on American foreign policy, and they recommended against immediate release of a public statement. Several others opposed any publication at all. Thereafter, on October 21, Smith notified Foster at the Commission that the State Department had reached an "informal consensus" that publication would be deferred for some months.[24]

It was already too late, however, to stop public discussions. Like the radioactive cloud which had swept over the Pacific, the fallout debate could not be contained within government circles. Perhaps taking advantage of Bugher's Texas speech or press coverage given to it, Joseph and Stewart Alsop were among the first journalists to recognize that the hydrogen bomb was a radiological weapon and not simply a gigantic version of the atomic bomb. Atomic bombs inflicted radiation casualties, the Alsops observed, but these hardly mattered since blast and heat damaged a larger area than that affected by radiation. The radiation effects from the thermonuclear bomb, on the other hand, far transcended the destruction caused by blast and fire. The Alsops clearly understood the strategic implications of this fact. They estimated that one hundred such super bombs could not only destroy most of America's major cities, but could also temporarily paralyze much of the industrial eastern seaboard.[25]

Thereafter, in the October issue of the Bulletin of the Atomic Scientists, Harold A. Knapp, Jr., a Navy Department analyst and the civil defense director for South Woodley, Virginia, estimated the potential threat of thermonuclear war to his small suburban community. Located seven miles from the Pentagon and ten miles from the White House, South Woodley was easily within the range of a hydrogen bomb aimed at Washington, D.C. Although Knapp focused almost exclusively on blast and thermal effects, he stressed the need for more technical information, especially concerning fallout, so that effective civil defense plans could be formulated.[26]

FALLOUT: WHAT THE PUBLIC SHOULD KNOW

From within the Commission and the interagency task force, Foster continued to push for full public disclosure. Foster identified the issue as one of the gravest problems facing the Administration -- so important that no one less than the President could deal with it adequately. Foster conceded that disclosure by the government of the full dangers created by fallout was certain to create anxiety throughout the nation and abroad. Nevertheless, Foster believed it essential for Americans to confront "the stark facts of life" so that the public would support effective civil defense and dispersal of key industries. Acknowledging that recent press statements had hinted at the truth, Foster believed the public was prone to dismiss such reports as "journalistic exaggerations." Only with official sanction from the President would Americans be convinced that the thermonuclear age required a radical change in the physical structure of urban centers which were too highly concentrated in cities such as New York and Chicago.[27]

Foster anticipated several problems in releasing an official public statement of the effects of fallout. In Europe, he predicted, neutralist sentiment would almost certainly be strengthened. On the other hand, at home the public might clamor for increased expenditures on continental defense at the expense of other military programs. Foster was also worried about the economic impact that such a statement might have on large cities where business interests could claim that property values were needlessly impaired by hysteria generated by disclosure. The political consequences were even more uncertain, and Foster speculated that an announcement could augment either the ranks of those who sought a retreat from containment or of those who advocated preventive war on the theory that the United States might better survive an immediate conflict. Most seriously, he argued that without public disclosure the civil defense officials could not organize effective programs in ignorance of the dangers to be overcome. To minimize hysteria while giving proper emphasis to the dangers, Foster recommended that Eisenhower inform the American public in a fireside talk over television.[28]

Val Peterson, Federal Civil Defense Coordinator, did not wait to find out what the President's cabinet planned to do. Three weeks after Bugher's Texas speech, Peterson startled state civil defense directors at a closed meeting in Chicago by warning that "many millions of lives" might be lost to fallout unless proper civil defense precautions were adopted. But the civil defense directors were not the only startled officials. With the assistance of several dramatic charts, Peterson had so graphically described fallout patterns that Commissioner Libby worried whether the civil defense administrator had compromised classified information. Reminding the Commission that fallout comes from fission not fusion, Libby observed that the government could not admit that several hundred square miles were contaminated without disclosing the fact that the thermonuclear bomb contained a fission component of real magnitude. Nichols quickly pointed out that both the Lucky Dragon incident and the injury to the Marshallese had already compromised this information to a considerable degree. Japanese analysis of the fallout debris collected from the Lucky Dragon would ultimately render Libby's objection moot. Nevertheless, the Commission decided to censor carefully a ten-minute film on the dangers of fallout which the Federal Civil Defense Administration was producing.[29]

During November 1954 the Administration lost its chance to provide candid fallout information to the American public. Nichols told the general advisory committee that the British had already constructed an accurate map of a hypothetical fallout ellipse by scaling up known test data. Libby also noted that Knapp's article on South Woodley had underestimated fallout by factors of five to ten. Since 1953, Bugher reported, Project Gabriel-Sunshine had sharpened the Commission's understanding of fallout. After one of the big shots, for example, iodine 131 could be picked up anywhere in the world. Bugher estimated that every American received a dose to the thyroid equivalent to about 0.5 percent of that received by the Rongelap islanders. Without specifying localities, Bugher cautioned against the use of milk from heavily contaminated areas. Surveys also showed a consistent pattern of increasing levels of strontium 90 detectable in the New York milk supply. All this information on fallout, however, was still highly classified. In order to facilitate civil defense planning, Libby obtained a consensus from the committee that the Commission should increase the flow of information to the public despite the fact that fallout studies were still incomplete.[30]

Unfortunately Strauss was distracted by the Dixon-Yates hearings on Capitol Hill and was unable to attend a crucial luncheon-conference at the Pentagon on November 8, 1954. Secretary of Defense Wilson, the highest ranking official present, strenuously objected to any recommendations involving presidential announcement of fallout hazards. Throughout the conference Wilson stressed the importance of allaying public anxiety about the prospects of thermonuclear warfare, particularly with reference to fallout. Too much had already been said publicly about fallout in his opinion; he believed that before the government outlined the full extent of the danger, it should make civil defense plans to cope with an "atomic blitz." That was just the point, Peterson argued; he could not develop an effective civil defense program without popular support based on public understanding.[31]

Because he was the only cabinet-level officer present, Wilson dominated the meeting. Thus, instead of forwarding a recommendation to the President, as favored by Foster, the conference decided to establish a new working group organized by the Office of Defense Mobilization to make a thorough study of problems associated with "victorious survival in the event of atomic-nuclear warfare." Working in cooperation with the Commission, the Department of Defense, and the Federal Civil Defense Agency, the new working group was to

confine itself to nonmilitary matters and report directly to Flemming, rather than to the public.[32]

Ironically, it was British Prime Minister Winston Churchill, not Eisenhower, who first expressed public concern over fallout. Speaking to the House of Commons on November 30, 1954, Churchill expressed his worry that cumulative radioactivity released from nuclear explosions would have serious effects on the earth's atmosphere for five thousand years. As noted in the New York Times, Churchill's statement was technically and militarily "confused and confusing," yet it also addressed publicly one of the great mysteries, and possibly one of the worst dangers, of the nuclear age.[33]

As if to underscore Churchill's concern, Ralph E. Lapp published the first of his articles on fallout in the November issue of the Bulletin of the Atomic Scientists. What chance the Commission had enjoyed to lead public discussion on fallout was now gone. As a nuclear physicist who had worked at Los Alamos during World War II and later with the research and development board of the Defense Department, Lapp could write with some authority on nuclear weapons and their effects. Although Lapp referred to fallout as a "secondary hazard," he accurately observed that the fallout ellipses from Bravo had stunned civil defense planners and caused a major shift in policy. Lapp also demanded that the Federal Civil Defense Administration be given access to classified data on fallout so that the agency could accurately translate them into a realistic hazard assessment for the American public. Hanson Baldwin of the New York Times endorsed Lapp's plea, while in the same issue which contained Lapp's article, the editors of the Bulletin of the Atomic Scientists reprinted Albert Schweitzer's appeal to scientists to speak out for a suspension of weapon testing. Thereafter, Eugene Rabinowitch, the Bulletin's editor, in commenting on both Knapp's and Lapp's articles as well as Bugher's speech, stated that the American nation as a matter of right should be given "all the information needed to prepare intelligently for the defense of its cities, not only against blast and fire of an atomic war, but also against its radioactivity."[34] Clearly, public assessments were becoming more accurate and more insistent.

In its own way, the Commission continued to encourage studies of the effects of ionizing radiation. At a national conference on genetics sponsored by the division of biology and medicine at the Argonne National Laboratory in November 1954, more than fifteen leading scientists were invited to present research on the effects of radiation on genes, chromosomes, cells, tissues, organisms, and populations. Although the papers were mostly technical reports of experiments with mice, fruit flies, plants, or other organisms, Bugher reminded the conference of the geneticists' larger responsibility, as a consequence "of man's modification of his environment," to assist in replacing opinions with conclusions in the formulation of national policy.[35]

More directly related to the Bravo fallout, at the invitation of the science council of Japan, the Commission sent a delegation of six scientists headed by Paul B. Pearson, chief of the biology branch of the division of biology and medicine, to a United States-Japanese conference on radiology. The conference, which was a success far beyond the Commission's most sanguine hopes, met in Tokyo from November 15 to 19. It was apparent from the outset that the Japanese considered the conference of major international importance. Consequently, the Americans, including Morse Salisbury, the Commission's chief public relations officer, prepared carefully for the meetings. Despite considerable apprehension among the scientists arriving in Tokyo less than two months after Kuboyama's death in September 1954, a friendly atmosphere quickly developed between the delegates of both countries. At the end, the Americans were satisfied that they had provided the Japanese with a considerable body of

useful information. In turn, the United States delegation was gratified to receive impressively extensive data concerning fallout from both American and Russian tests.[36]

In addition to these scientific conferences, with renewed support from the general advisory committee, Libby offered the Washington conference of mayors on December 2 the government's most definitive statement to that date on radiation hazards from fallout. Although Libby's speech was by no means alarmist, he took pains to emphasize the qualitative (and unexpected) differences between fallout and traditional hazards from blast and heat. Libby stressed that an unprotected populace would suffer seriously, but he was relatively optimistic that a sheltered citizenry, if beyond the immediate zone of detonation, could survive a thermonuclear attack. Skirting direct reference to testing, Libby did imply that the weapon tests had not added appreciably to worldwide natural background radiation.[37]

Considering the fact that neither the cabinet nor the President had as yet approved a public statement on fallout, Libby's speech had been remarkably candid. Nevertheless, Strauss knew that the Commission could no longer delay issuing an official statement which his colleagues had already approved. Citing the death of Kuboyama, Churchill's parliamentary speech, and recent articles by Baldwin, the Alsops, and Drew Pearson, Strauss also expressed his concern about the numerous alarming statements that had already been made by responsible American and foreign military authorities and scientists. Among the most serious, in Strauss' opinion, had been the widely quoted statements by Alfred H. Sturtevant, a professor of genetics at the California Institute of Technology and by Louis de Broglie, the French physicist and Nobel laureate. They predicted that the H-bomb tests would inevitably increase future birth defects. De Broglie had warned that nuclear experiments had created a danger to the world's plant and animal life. Within security limits, Strauss insisted, the Commission simply had to be responsive to requests from the press for authoritative information on fallout hazards. Otherwise, the Commission would be accused of concealing vital information from the American public while at the same time it was attempting to counter fears that public health and safety were endangered by continued weapon tests in Nevada and in the Pacific.[38] From Strauss' perspective, a policy of candor would provide the most certain protection for nuclear testing.

INTERNATIONAL IMPLICATIONS

Dulles and Herbert Hoover, Jr., at the State Department were the major opponents of releasing the Commission's statement on fallout. Fearing severe damage to American foreign policy, Hoover cautioned the Operations Coordinating Board that even a discussion with the cabinet might result in a disastrous leak. The French parliament, which had recently rejected the European Defense Community, was then considering ratification of the London Agreement rearming West Germany. Hoover thought French Communists would use this fact to distort the fallout data in a propaganda campaign against the United States. In addition, it seemed likely that the information would stimulate pacifism, especially in Germany, and create additional strains between the United States and the new government in Japan. At Hoover's suggestion, the Operations Coordinating Board recommended that the Commission's statement not be circulated even within the American government until after Strauss, Dulles, and the President determined how best to present the issue to the cabinet.[39]

Hoover had not categorically opposed release of the Commission statement, only the timing of it; although, as Foster put it, "the State Department never will think the time is propitious." Strauss and Nichols observed that the

Commission's authoritative statement could not cause any more damage than had uninformed but sensational speculations in the press. When Dulles personally requested Strauss to defer publication until the NATO negotiations had been completed, the chairman acceded but not without carrying the matter directly to the President. At a cabinet meeting on December 10, 1954, Eisenhower also noted, as Strauss put it, "the virtue of laying all the facts on the line before there is an inquisition." Encouraged, Strauss reiterated that the best way to combat sensationalism and alarm was "to put the full facts forward with frankness."[40] Another month was lost, however, waiting for Dulles to return from Europe.

In the meantime, the Commission searched for a way out of its dilemma. At his news conference on December 17, Strauss reported that the Commission staff was studying the fallout problem and expressed his hope that a public statement could be made at a later date. In support of the chairman, the general advisory committee at its mid-December meeting continued to favor the release of a concise statement. Thus with the State Department, the Federal Civil Defense Administration, and the Operations Coordinating Board kibitzing in the background, the Commission in January 1955 struggled through at least five different drafts of its statement on "The Effects of High Yield Nuclear Detonations."[41]

During these deliberations Libby insisted that a fallout map be included in the press release. Gordon L. Dunnning, health physicist with the division of biology and medicine, did not regard the map as either necessary or advisable, but rather contended that an official fallout map would raise more questions than it answered. Because a fallout map would have to be constructed using data gathered from only a few points, Dunning believed that any such illustration could be easily misinterpreted. Consequently, the idea of providing an official fallout map was ultimately abandoned, leaving journalists and others to devise maps of their own.[42]

Ironically, foreign developments, not domestic, precipitated publication of the Commission's fallout statement. In London, Harold Macmillan, Minister of Defense, informed Deputy Secretary of State Dillon Anderson that the Admiralty was obligated by law to report to Parliament on February 15 on the state of the United Kingdom's defenses. Churchill had directed that the report include a statement on the effects of thermonuclear weapons. Having learned that the Commission was considering the release of a fallout statement, Macmillan requested an advance copy to assure that British and American fallout data were compatible. Gerard Smith, in his critique of the Commission's statement, was especially concerned that the timing of the release be coordinated with the British and the Canadians so that even minor discrepancies could be reconciled rather than feed further speculations.[43] Foster seized this opportunity to emphasize how embarrassing it would be to the Administration if the American people received their first detailed official information on fallout from the British government.

From another perspective Foster also saw the necessity of a prompt release. With the five-power discussions on limitations of armaments scheduled to begin in London in late February 1955, Foster was anxious for the United States to take the initiative by firmly establishing the American position. Communist propaganda, he observed, had already branded the United States as the originator and principal protagonist of atomic warfare. Nehru, Mendes-France, and perhaps even Churchill might support Russian demands for halting thermonuclear testing. In agreement with Strauss, Foster believed that testing could best be defended by outlining the United States' position before the communists organized another worldwide campaign against testing, based on distorted use of fallout information.[44]

THE FALLOUT STATEMENT

Now that Whitehall had effectively made the decision for them, Eisenhower and the National Security Council finally saw the need to release the Commission statement. On February 2, 1955, the President personally reviewed and annotated the draft, principally by underlining key phrases in the report. The following day at a meeting of the National Security Council Eisenhower expressed his determination not to be scooped by the British. Strauss assured the President that the Commission's statement had been carefully worked out with the Operations Coordinating Board. The Civil Defense Administration, he reminded the President, had been after such a statement for months. Despite continued fears expressed by Wilson and others, Eisenhower observed that his Administration had probably underplayed civil defense during a time when an informed citizenry was important.[45]

Eisenhower formally approved release of the Commission's statement on "The Effects of High-Yield Nuclear Detonations" on February 3; whereupon the Commission immediately began preparations to publish its report. Before any action could be taken, however, Dulles returned from vacation. He complained that the Commission statement would stimulate neutralism and damage United States interests in West Germany and the Far East as well as feed the Russian propaganda mill, which had been churning out demands for outlawing nuclear weapons. After Eisenhower asked that the best public relations man be consulted on the advisability of releasing the statement, Strauss dutifully reported that William E. Robinson, president of the Coca Cola Company, recommended against issuing any statement at all, on the grounds that it might stimulate neutralism overseas. Undaunted, Strauss once again insisted to Eisenhower that, irrespective of international complications, the American people should be told the facts so that civil defense planning could proceed. In a personal appeal to Strauss, Val Peterson concurred that without the Commission statement, state and local civil defense officials lacked any planning base for protective measures.[46] At this late date Dulles could not block publication, but at his behest the Commission dropped the dramatic fallout map which Libby had thought was important.

Finally, on February 15, 1955, the Commission issued its report accompanied by a statement from Strauss. After reviewing the effects of the Bravo shot, Strauss offered assurances that continental testing at the Nevada Test Site created no offsite safety or health hazards. Concerned that the statement might jeopardize United States testing, Strauss stated without qualification that the hazard had been confined to the controlled area of the test site. The highest actual dose of radiation at an offsite community, he observed, was estimated to be less than one-third that allowed yearly for atomic energy workers under the Commission's "conservative safety standards."[47]

To the satisfaction of the State Department, foreign reaction to the Commission's statement was surprisingly mild. Among NATO countries the announcement was accepted soberly and without much comment, according to reports to the National Security Council. Other international news tended to obscure the immediacy of the Commission's story. In Switzerland, anticommunists seized the Rumanian legation. In London the United Kingdom announced plans to build the H-bomb and to construct twelve nuclear power reactors. The French were bedeviled by their continuing political crisis, while in Japan a fire in Yokohama and Soviet-Japanese talks preempted most headlines. The only communist nation even to mention the report was East Germany. The Soviet Union and the Peoples Republic of China pointedly refrained from noting the statement, but rather emphasized the communists' commitment to peaceful uses of atomic energy as well as to banning nuclear weapons. There were scattered sharp reactions in India,

Japan, and France, while in London the Daily Worker played up the terror of fallout to support its continued "Ban the Bomb" campaign. But aside from predictable criticism from the left, the National Security Council could discern no stimulus towards neutralism among America's allies.[48]

At home the Commission did not fare nearly so well. Before the Commission could release its statement to the public, Ralph Lapp on February 11 published his second and most alarming article on "Radioactive Fall-out" in the Bulletin of the Atomic Scientists. Lapp based much of his information on Libby's December 2, 1954, speech and on the Japanese reports on the radiological analysis of "Bikini ashes." At a time when most people had scarcely begun to comprehend the meaning of Hiroshima, Lapp conceded that it was still too early to appreciate the implications of the Bravo test. Nevertheless, he asserted that the new super bomb could be considered a radiological weapon which could "contaminate a state the size of Maryland with lethal radioactivity."[49] Lapp agreed with Libby that sheltering would provide substantial protection from radioactive fallout, especially if the government constructed an extensive system of fallout shelters on the periphery of the major cities. But he also criticized the government for maintaining tight secrecy on this vital issue. Prophetically, Lapp defined radioactivity as something mystical, understood by less than 0.1 percent of the American people. For their part, few scientists understood the terror which the "invisible killer" held for the nonscientist. Candor and education were the only antidote to this modern terror.[50]

Lapp's article in the Bulletin and another in the New Republic on February 14 placed the Commission in the worst possible light. Not only did the Commission fail to receive credit for its candor, but its own statement, long in preparation, also subsequently appeared to be a reluctant response to Lapp's crusade. All along Strauss had feared just such an eventuality. Back in November he had predicted that the Commission might be left "holding the bag" just as in the Dixon-Yates controversy "where we wished to make all the information public long before."[51] Now for the second time within six months the Commission had to accept the responsibility and criticism for an Administration decision over which it had no control.

THE KEFAUVER HEARINGS

Following a flurry of excitement in the press, the Senate Subcommittee on Civil Defense of the Armed Services Committee on February 22, 1955, quizzed Libby and Bugher on the Commission's weapon effect statement. Senator Estes Kefauver, chairman of the subcommittee, wanted to know why the Commission had not published official information about fallout until after the public was alarmed by Lapp's sensational disclosures. Neglecting to point out that most of the magazine articles were based on information taken from his own December 2 speech, Libby simply explained that the Commission wanted to get the facts straight. Although Kefauver and Stuart Symington, who had joined the hearing, pressed for a more detailed explanation, Libby was not free to tell them the real reason for delay -- that the State and Defense Departments had blocked publication for several months. Consequently, as Symington pointed out, public confidence in the government's assurances was shaken when Lapp's article was published before Strauss' official announcement. Lapp himself, first as a witness before Kefauver's subcommittee and subsequently in a follow-up article in the Bulletin of the Atomic Scientists, also accused the Commission of being dilatory and dissembling in informing the American people of fallout hazards. The year of secrecy maintained by the Commission resulted in a year of paralysis on civil defense preparedness, Lapp charged.[52]

Even as Kefauver's committee conducted its hearings, the Commission continued continental testing in Nevada with Operation Teapot. Libby assured the senators that the Nevada tests were being conducted "in accordance with health and safety criteria designed to insure that there will be no harmful effects on the public." Indeed, Libby continued, the Commission had detected no fallout hazardous to human, animals, or agriculture beyond the immediate vicinity of the test site. Libby did not actually state that there were no risks in continental testing, but he certainly implied that the risks were minimal. In a speech delivered to University of Chicago alumni on June 3, 1955, and later submitted as an exhibit for the published civil defense hearings, Libby stated that the genetic damage caused by fallout from the Teapot tests would be so slight that no measurable increase in defective individuals would be observable.[53]

FALLOUT MONITORING AT TEAPOT

Libby had every reason to speak with confidence about the effectiveness of fallout precautions taken at Teapot. In the two years since the Upshot-Knothole series the weapon laboratories at Los Alamos and Livermore had again accumulated a large backlog of tests that were urgently needed to develop a variety of new weapons, especially small weapons, both fission and thermonuclear. Looking toward the reduction of the large amounts of fallout associated with tests in 1953 and 1954, the laboratories were also beginning to explore new designs that would reduce the ratio of fissionable to thermonuclear fuel in weapons so as to lessen fallout. The Commission had approved an ambitious program for fourteen shots at Teapot, but nine of these were less than ten kilotons and all the high-yield shots were fired on towers 400 or 500 feet high. As a further precaution against heavy fallout, the new guidelines for continental test operations developed after Upshot-Knothole were now in effect. Among these was the decision to reduce the maximum permissible exposure for off-site personnel to 3.0 roentgens for an entire year.[54]

The most significant change in test procedures at Teapot was the increased attention given to off-site monitoring and the formal, largely independent role assigned to the U. S. Public Health Service. The service had first begun to respond to the health hazards of radiation in 1948 and by 1950 had organized a series of courses in radiation health training for its own officers and for other federal, state, and local agencies. About a dozen officers from the Public Health Service had assisted, at the Commission's request, in collecting fallout data at fixed stations in small communities just outside the test area during the Upshot-Knothole series. For the first time, complete fallout records were made for an entire test series in these communities. The Public Health Service officers, however, were under the complete control of the Commission and the test organization, and all of the records which they collected had to be turned over to the test group as classified information.

By the time of the Teapot tests, the Commission had signed an agreement with the Public Health Service to participate in radiation monitoring in a more formal way. Sixty-six officers from the service participated in Teapot and assisted in collecting information that was later published on each of the fourteen shots. During the series the officers were permitted to discuss their readings with residents and provided information about the tests. These procedures not only produced more complete data than had been collected at earlier tests; but they also helped to assure near-by residents that potential fallout hazards were not being concealed by classifying the data.[55]

THE NEVADA TEST SITE

Despite official assurances, concerns about the continued use of the Nevada Test Site increased after release of Libby's fallout statement. On the day after his testimony before Kefauver's subcommittee, Libby was shocked to learn that Senator Anderson had written Strauss to request another reassessment of the use of the Nevada site for testing of any but the very smallest devices. Anderson's about-face coincided with second thoughts which Strauss also harbored. The chairman now confessed to Murray and Libby that if the decision were his, the two largest shots in the Teapot series would be fired in the Pacific. He had always been frightened, Strauss noted somberly, that something would happen which would damage the Commission's public image.[56]

When Strauss observed, on the other hand, that both of the Las Vegas newspapers favored continued use of the Nevada site on the grounds that the tests promoted both national defense and local prosperity, Libby interjected that this was a most sensible point of view. "People have got to learn to live with the facts of life," Libby declared, "and part of the facts of life are fallout." Such a philosophy was all right, Strauss countered, "if you don't live next door to it,". . ."or live under it," as Nichols ruefully noted. Nevertheless, Murray insisted, the Commission could not let anything interfere with the Teapot test series, "nothing." Bugher assured the Commission that residents of the area, and especially those living in St. George, Utah, were hypersensitive to low-level radiation from fallout. "It is not a question of health or safety with St. George," Bugher reported, "but a question of public relations."[57]

New developments continued to make the Commission look bad on the fallout issue. In March, radio-active fallout from the Teapot tests was reported in widely scattered locations in Colorado, Nebraska, Chicago, New York City, New Jersey, and South Carolina, Yet in his testimony before Kefauver's committee on March 4, Val Peterson complained that security considerations had hampered the Civil Defense Administration in making available to state and local civil defense planners pertinent information on weapon effects and fallout. Even within the Civil Defense Administration, Peterson could not discuss fallout data with officials cleared for access to top secret information because they did not also have a clearance for Restricted Data. Unintentionally, Peterson left the impression that the Commission had hindered the civil defense effort by being overly strict, inflexible, or both. In fact, the administration had difficulty analyzing classified fallout data provided by the Commission because Peterson had self-consciously kept the number of cleared persons as small as possible. This restriction proved shortsighted after several cleared staff members resigned rather than move to the agency's new headquarters in Battle Creek, Michigan. Although Peterson duly explained the problem to the Joint Committee, the press in the meantime had castigated the Commission for being uncooperative and secretive.

The Joint Committee's hearings on civil defense planning on March 24, 1955, enabled Strauss to explain for the first time why the Commission had delayed in releasing the fallout effects statement. By then, however, the Joint Committee was rather disinterested in the Commission's old dilemma, and Strauss' explanation for the delay was greeted with little comment or publicity.[58]

Of far greater interest to the Joint Committee were the possible effects of nuclear tests on weather and on human health. On April 2, ranchers around Sheridan, Wyoming, were mildly annoyed when a spring snow began to dust the semi-arid range. Before it was over, the storm buried northern Wyoming under almost forty inches of snow, killing livestock and paralyzing the region. Other severe weather had complicated Senator Anderson's life. Returning home for

Easter recess by air, Anderson could not land at Albuquerque. Later, continuing storms prevented him from catching the same flight for his return trip to Washington. It was the first time in thirty years that the senator had experienced such weather in New Mexico. Yet the Rio Grande was dry in April, an unprecedented situation according to the records of the National Weather Bureau. Harry Wexler of the United States Weather Bureau observed that it was almost impossible "to prove that something isn't so." From Wexler's point of view, weather conditions were essentially normal, but he admitted that there was always a slight possibility that the tests had affected the weather. Because of this possibility, he concluded, no matter how much evidence the weather bureau marshalled to the contrary, there would always be a segment of the public who were convinced that testing had altered the weather.[59]

FALLOUT: AN INTERNATIONAL ISSUE

While the public remained primarily concerned about the weather, which apparently still remained impervious to human will, scientists worried more and more about the health effects of fallout. On March 3, as a direct reaction to the Commission's February 15 statement, M. Stanley Livingston, a prominent nuclear physicist and chairman of the Federation of American Scientists, proposed the establishment of a United Nations commission to assess the radiation dangers from nuclear tests. Citing the injuries to the Lucky Dragon fishermen, the contamination of Pacific tuna, and the call of India's Prime Minister Nehru for an H-bomb test ban, Livingston observed that the implications of thermonuclear testing could not be limited to national considerations. On the heels of the federation's proposal, the Indian government sent a formal note to the United Nations Secretary General reiterating its intention to press for a moratorium on nuclear testing at the next meeting of the United Nations Disarmament Commission.[60]

That international fallout studies might be linked to demands for a cessation to nuclear testing was precisely what the Commission and the Defense Department had feared. Herbert B. Loper, Assistant Secretary of Defense (Atomic Energy), warned that a United Nations study "would place the United States in a position of recognizing and admitting that its weapons tests are endangering the lives and health of the peoples of other countries."[61] Although Loper did not think the tests had been inimical to public health, he did believe an international debate on fallout would damage United States national interests.

Similarly concerned, the British Embassy on March 18 advised the State Department that a United Nations scientific study of fallout would merely provide the Russians with a propaganda opportunity. As if to confirm the political sensitivity of the issue, four days later the Conservatives in the House of Commons beat back by forty votes a Labour motion for cessation of nuclear tests until an international conference of scientists had studied radiation effects.[62]

The Commission's initial strategy was to oppose the United Nations project while promoting an independent study by the National Academy of Sciences, funded by the Rockefeller Foundation. At the request of the Commission even before Loper expressed his opposition to a United Nations study, the National Academy of Sciences announced on April 8 its willingness to prepare a report with Rockefeller money and Commission cooperation. The Commission's division of biology and medicine had concluded that the National Academy of Sciences was not only a more appropriate group than the United Nations for this task, but also that the American scientists could be given access to certain highly classified data which would lend greater public credibility to an academy report.[63]

The Commission's alternative was compromised, however, when United Nations Ambassador Lodge, as a countermove in the face of growing international concern, urged the State Department to submit a resolution to the General Assembly calling for the United Nations to collect and disseminate national radiation health studies. Under Lodge's plan, the National Academy of Sciences study would become the United States' major contribution to the international data collection. Lodge obviously wanted the United States to seize the initiative so that the Americans could gain some control over what appeared to be an inevitable United Nations responsibility. That same day, April 13, Senator Frederick G. Payne of Maine, supported by twenty-one other senators, introduced a resolution supporting a United Nations study of the radiation effects from nuclear explosions.[64]

Again Strauss found himself at odds with the State Department. In his April 15 testimony to the Joint Committee he had planned to state flatly his opposition to any international study on the "radiation problem." On the preceding day, however, at the urging of Under Secretary of State Hoover, Strauss agreed to withhold his opposition and merely to note that the possibility of an international study at some future date was not ruled out. Nevertheless, in executive session before the Joint Committee Strauss clearly indicated his sentiments by reporting that the Commission had taken a position not favoring the federation's proposal. Repeating British opposition to the idea, Strauss frankly indicated his concern that a United Nations panel might become "a packed jury of scientists," many of them from Iron Curtain countries more interested in propaganda than fact.[65]

Despite Strauss' and the Commission's continued objections, Lodge adroitly secured the Administration's support for the United Nations radiation study. On April 20, 1955, Senator Payne, now with the support of twenty-five sponsors, formally introduced a joint resolution calling for the United Nations study. Shortly thereafter, on May 4, Swedish Foreign Minister Bo Osten Unden announced that Sweden might also propose a United Nations study. Lodge was now convinced that some delegation -- either Sweden, India, or Pakistan -- would raise the issue. He was determined to gain control of the situation in order to protect United States security interests, as well as to reap public credit. By advocating international coordination of national studies, Lodge hoped to divert attention from American tests to those of the United Kingdom and the Soviet Union, and at the same time reduce building pressures for a moratorium on testing. Indeed, unless the United States acted positively, Lodge feared, the Geneva peaceful uses conference might degenerate into an international debate on the effects of nuclear testing.[66]

Although even Gerard Smith remained skeptical of Lodge's position, Loper conceded in May that from a propaganda point of view, the Lodge approach had considerable merit. Because the United Nations would serve only as a clearing house for collecting and distributing studies which might be produced anyway, the Department of Defense had no continuing objection.[67] With Loper's acquiescence, Lodge could now tackle the Commission head-on.

On May 20, 1955, Dulles, Strauss, and Lodge, with Smith and Hoover, met to resolve the impasse. Although preliminary meetings among Lodge, Libby, Foster, and Smith had laid the foundations for an agreement, Strauss at first seemed as adamant as usual. After Dulles reiterated Lodge's arguments, giving special emphasis to the assumption that the Swedes or Indians would act if the United States did not, Strauss confessed that he was willing to accept the onus of opposing anything proposed by these governments. Strauss observed that it might take two hundred years to document the effects of radiation on human genetics. In the meantime, the use of antibiotics in modern medicine might produce even

more serious mutations than radiation. But Strauss did not oppose the international study simply because he believed it would produce inconclusive results. Fundamentally, Strauss and the Commission feared that an international investigation of radiation effects would lead into "dangerous paths where demands for cessation of nuclear tests and the disclosure of information concerning [United States] weapons would possibly result."[68]

Lodge reassured Strauss that, if adopted, the Unites States proposal would not call for any "judgment" on the part of the United Nations. In fact, Lodge suggested using the Disarmament Commission, on which the Soviet Union served as a minority of one, as a clearing house to receive national reports. Strauss understood all this, but he was skeptical that the United States could control either debates or amendments once the matter had been brought before the United Nations. When Gerard Smith next predicted that the Defense Department would object to linking radiation studies with disarmament, Dulles replied that the alternative, an ad hoc body, inevitably would raise the question of Indian membership. The consensus was that the Disarmament Commission, on which India was not represented, was the most readily controllable body available. With that understanding, Dulles asked Lodge to prepare a revised draft resolution.[69]

Somewhat belatedly, General Loper, now with second thoughts, expressed the Defense Department's objections to any language in the draft resolution that suggested guilt or implied any official uncertainty on the part of the United States. "While we recognize that many of our scientists, particularly those not directly connected with the radiation evaluation program, are critical, skeptical and uncertain," Loper wrote to Smith, "the official position of the United States Government, as expressed by the Atomic Energy Commission, is that there is no basis for concern." Accordingly, Loper insisted that the resolution make clear that the United Nations' only mission would be "to weigh the evidence and make known the facts."[70]

Throughout the spring and summer of 1955, the Commission contended that fallout from weapon tests had created a public relations issue, not a health and safety problem. Furthermore, along with the Department of Defense, the Commission believed that national security might be endangered if public concern over fallout led to political pressure to suspend nuclear testing. Consequently, the Commission intensified its public relations offensive by encouraging Dunning to prepare a scholarly article on "The Effects of Nuclear Weapons Testing." Dunning's highly technical paper, however, was not published until December 1955, and did little to relieve public anxiety.[71] In a more popular vein, Commissioner Libby addressed the alumni at the University of Chicago on "Radioactive Fallout."

Although Libby's speech was also highly technical, it was straightforward about the dangers of radioactivity while offering the public some assurances. If all of the dosages from all atomic tests since 1945 were added together, Libby calculated, the total dosage for the American people would average considerably less than one-tenth roentgen or less than .02 percent of what was believed to be a lethal dose (400 roentgens). In actual fact, Libby estimated that as of January 1, 1955, the total dosage over the United States from tests was about .001 roentgen per year. The tests, he concluded, "therefore, do not constitute any real hazard to the immediate health." On long-range somatic hazards, Libby flatly stated that "natural radioactivities of the body, the effects of the cosmic radiation and the natural radiation of the radioactivities of the earth's surface constitute hazards which are much greater than the test fallout hazards." Libby did not want to imply that there were no risks, but rather that the risks from testing were no greater, and indeed were less, than those naturally encountered.

Libby underscored this thesis in his section on the genetic effects of testing. Quoting from a May 1955 report of the advisory committee on biology and medicine, Libby conceded that radiation produced by fallout from tests as well as from the peaceful application of atomic energy, would produce additional mutations in human genes. On the other hand, there would be "no measurable increase in defective individuals" as a result of the weapon tests because the small number of additional cases would not measurably change the ratio of forty thousand defective children out of four million annual births. Of course, both somatic and genetic damage caused by all-out nuclear war could be catastrophic, an estimate Ralph Lapp confirmed simultaneously[72] in his June 1955 article published in the Bulletin of the Atomic Scientists.

At the conclusion of his Chicago speech, Libby mentioned both the study by the National Academy of Sciences funded by the Rockefeller Foundation and a similar study in England by the Medical Research Council under the chairmanship of Sir Harold Himsworth. Without mentioning Lodge's proposal for a United Nations project, Libby simply expressed his hope that the American and British studies would be fully coordinated.

Finally reconciling the Commission and the Department of Defense to the wisdom of an American initiative at the United Nations, Lodge announced the United States proposal for an international pool of fallout data at the United Nations' tenth anniversary celebration in San Francisco. Approved in advance by several nations, including Britain and Sweden, Lodge's plan was to assemble all available information on the effects of nuclear test fallout "so that all nations can be satisfied that humanity is not endangered by these tests." Giving credit to the influence of Libby's June 3 speech in Chicago and thereby offering the Commission some welcome publicity, Lodge reaffirmed his conviction that fears about fallout had been greatly exaggerated. Because military topics were not to be considered at the Geneva peaceful uses conference in August, Lodge intended formally to introduce the American resolution to the General Assembly when it reconvened in September.[73]

THE INSEPARABLE LINKAGE

The Bravo shot unexpectedly had forged inseparable links between the fallout issue and international demands for a nuclear test ban. With the exception of Murray, the Commission labored in vain to break the two issues apart. But as in tempering steel, the more the Commission threw cold water on the linkage, the harder it became. If anything, the Commission's February 15, 1955 statement on fallout and its spring public relations campaign on the safety of testing had only served to reinforce the interrelatedness of the two issues. The chain of circumstances which led inexorably to the nuclear test moratorium in 1958 was not singularly, or even primarily, the making of the Atomic Energy Commission. In fact, the Commission consistently opposed a nuclear test ban. Nevertheless, the Commission's role was not one of simple, mindless opposition, but rather was complicated by the fact that it served as the President's main source of scientific and technical information on nuclear issues. As such, the Commission was often obliged to provide information and opinions which actually facilitated test ban negotiations. The ambiguousness of the Commission's task was especially revealed in its relationship to Harold E. Stassen, whom Eisenhower appointed as special assistant for disarmament on March 19, 1955.

Eisenhower's decision to make a Cabinet-level officer responsible for developing basic disarmament policy was unprecedented. Stassen had become something of a political wunderkind after Minnesota elected him the nation's youngest governor ever at the age of thirty-one. Thereafter, he served as one of the American delegates to the San Francisco United Nations conference in

1945. Beaten by Thomas E. Dewey for the Republican presidential nomination in 1948, Stassen had vigorously supported Eisenhower in the 1952 elections. Subsequently, he was chosen to head the Foreign Operations Administration. Following Stassen's disarmament appointment, Eisenhower was delighted when the press referred to the former governor as the "Secretary for Peace."[74]

Stassen was given a delicate assignment requiring utmost skill in balancing conflicting interests represented by the State Department, the Pentagon, and the Commission, as well as by the Soviet Union and America's NATO allies. Stassen's appointment was announced in the midst of the London Disarmament Conference which had convened in February 1955 only to be quickly deadlocked. Hoover, who was Acting Secretary of State while Dulles was in Bangkok, viewed the discussions as "only a debating exercise with the Communists using it for their usual propaganda purposes." Thus Stassen was called upon to conduct a comprehensive review of American policy and strategy.[75]

In addition to his immediate White House disarmament staff borrowed from various agencies, Stassen established eight task forces to study the requirements and methods of effective international inspection and control. Ernest O. Lawrence headed the task force on the inspection and control of nuclear materials. Others included General James H. Doolittle on aerial inspection and reporting, General Walter B. Smith on inspection and reporting of Army units, Walker L. Cisler on power and industry, and James B. Fisk of Bell Laboratories on communications. The entire effort would parallel the Commission's search for international control of the peaceful uses of atomic energy.[76]

Stassen had hardly begun his work when the Soviet Union offered a new proposal to the London Disarmament Conference on May 10, 1955. At first American negotiators were uncertain whether the Russian initiative was genuine or simply another propaganda ploy. Nevertheless, the imperatives of the thermonuclear age seemed to require that the Russians be given the benefit of the doubt until otherwise proven disingenuous. The Soviet proposals, which indicated much greater flexibility than ever before, essentially accepted the Anglo-French formulas for reductions in conventional and nuclear weapons and in armed forces. In addition the Soviet proposal called for the cessation of nuclear weapon tests as part of a ban on nuclear weapons. Although the Soviet Union continued to demand the elimination of United States bases abroad as well as abolition of nuclear weapons, the new proposal also recognized the scientific difficulties in accounting for nuclear material and in guarding against surprise attack.[77] From the American point of view, the Soviet initiative was unacceptable because it lacked provisions for effective safeguards and inspection.

By May 26, Stassen had prepared for the President his first report, which included an analysis of the Soviet proposal. Stassen believed that the Russians had placed disarmament in a "political package" which hinted at the possibility of a Russian withdrawal from central Europe in return for a United States pullback from Europe and the Far East. Although the Soviets had called for the abolition of nuclear tests and weapons, the Russian plan did not provide for the cessation of nuclear production. Furthermore, Stassen noted, the Soviet proposal offered only a "Korean-Armistice-Commission type of control over 'big' ports, railways, airdromes, etc." which was supposed to provide a cross-check on nuclear capabilities and a warning against surprise attack. Significantly, however, Stassen did not dismiss the Russian overtures out of hand. Rather, he stressed the importance of finding some means of ending the arms race on terms compatible with American security interests.[78]

On June 30, 1955, having already received unfavorable comments from the Commission, the Department of Defense, and the Joint Chiefs of Staff, Stassen briefed the National Security Council on his suggestions for a United States disarmament policy. Stassen recommended that the United States seek an agreement with the Soviet Union which would end the arms race by leveling off armaments, ceasing nuclear tests and weapon production, and establishing an International Armaments Commission to supervise an arms control agreement.[79] Eisenhower, who was generally sympathetic with Stassen's plan, thought the United States had to gain considerably more support from its allies, especially the United Kingdom, before any agreement could be reached with the Russians.

Defense Secretary Wilson explained that the Pentagon did not expect to settle all major issues with the Soviet Union before signing an arms control agreement. Nevertheless, without a significant change in Russian attitudes and policies on inspection and supervision, Wilson believed no agreement would be possible. The first order of business, Wilson suggested, should be to crack the Iron Curtain, perhaps through a movement toward free trade.[80] Speaking for the Joint Chiefs of Staff, Admiral Arthur W. Radford expressed their solid opposition to the Stassen proposal. He declared that the plan was unworkable unless it included Communist China as well. Otherwise, Stassen's project would lead to the military inferiority of the United States.

Replying with some warmth, Eisenhower reminded the council that the Joint Chiefs of Staff had also rejected the Baruch plan in toto. As far as Eisenhower could see, Radford believed that the United States "should proceed as at present in the arms race despite the fact that this was a mounting spiral towards war." With withering scorn, Eisenhower wondered why the Joint Chiefs did not at once counsel preventive war with the Soviet Union. Taking another tack, the President argued that if the Russians failed to "play straight" on inspections, the United States could always abrogate the disarmament agreement. Radford demurred, by granting the theoretical possibility of the President's argument, but he doubted whether public opinion at home or abroad would allow the United States to counter Russian violations. Somewhat more patiently Eisenhower admitted that Stassen's proposal raised problems, but it also had the virtue of being a creative starting point for negotiations. Then essentially concurring with Wilson and Radford, he agreed that the crux of the problem was inspection.

Now Dulles captured the lead in the debate. If the United States did not make some bona fide move towards disarmament, Dulles predicted that Americans would lose allies and the right to use foreign bases. Not only was it impossible to stand still, but the United States could not wait for the settlement of political issues in Europe and the Far East. In Dulles' opinion, disarmament and political settlement had to proceed concurrently. Agreement was possible, the Secretary of State believed, because the Russians genuinely wanted some reduction in the arms race in order to deal more effectively with internal problems. Granting that inspection was the central issue, Dulles thought that no one had sufficiently studied the matter, including Stassen. Would the United States really be willing to allow Russian inspectors into American industrial and military centers? Dulles was skeptical and reminded the council that policing had seemed impossible to Baruch's planners. Since disarmament negotiations would most likely break down at this point, inspections would be the area in which the Department of State would put its greatest effort.

Eisenhower was satisfied with Dulles' approach. Noting that the problem of inspection could not be readily separated from the substantive issues of disarmament, the President concluded with the obvious: the type of disarmament plan adopted would clearly dictate the type of inspection needed.

Throughout the debate Strauss sat glumly quiet. Opposed to a nuclear test ban, a key feature in Stassen's proposal, Strauss sought some means of supporting Wilson and Radford without incurring the wrath of the President. Finally he spoke pessimistically. Was it not possible, Strauss speculated wistfully, to pursue the approach first suggested by the President in his Atoms-for-Peace speech? Since the Russians could not be trusted, Strauss thought the best approach was the atomic pool which would drain off fissionable material from weapon stockpiles. Such an approach would take the heat off the United States while placing the Russians at a strategic disadvantage.

As the meeting concluded, Eisenhower ignored Strauss' irrelevant comments by returning to the main issue and asking Stassen to adjust his plan to an acceptable inspection system. Vice President Nixon concurred with the comment that there was nothing more important from a political point of view than an inspection system which would penetrate the Iron Curtain. The inspection issue, according to Nixon, was also the United States' most effective propaganda issue.

THE GENEVA SUMMIT CONFERENCE

Always suspicious of Russian motives, Dulles had responded to the gradual thaw in relationships with the Soviet Union by remaining cool himself to a summit meeting until after the Soviets had demonstrated their sincerity by signing an Austrian peace treaty. In May 1955, as part of their post-Stalin revision of foreign policy, the Russians suddenly signed an Austrian treaty. Now on the spot and fearful that the Soviets might achieve a significant propaganda victory from their talk of "peaceful coexistence," Dulles, with the backing of the National Security Council, nevertheless continued to believe that the Russians would not deviate from their attempts to disrupt NATO unity and to expand their influence, principally by subversion and insurrection, while avoiding direct confrontation with the western powers. Dulles predicted that the Russians would use the Geneva summit conference, now scheduled for July 1955, to achieve considerable gains in moral and social stature over western leaders. Unless the conference ended in utter failure, Dulles estimated that the Soviets would partially succeed in relaxing efforts at NATO buildup and German rearmament. In contrast, he did not believe that the Russians would achieve their disarmament goals by emphasizing "ban the bomb" at the expense of "the painstaking procedures needed to assure adequate safeguards." Dulles' confidence in the American ability to parry Russia's disarmament thrust was bolstered by the United States' plan to offer its own proposal designed to counter Soviet "ban the bomb" propaganda.[81]

Speaking directly to Soviet Premier Bulganin at the summit meeting in Geneva on July 21, 1955, Eisenhower offered his Open Skies plan, which called for an exchange of the blueprints of military facilities and establishing bases for aerial photography and reconnaissance in each country. If adopted, Eisenhower's plan would have greatly lessened the danger of surprise attack. The President envisioned Open Skies as a confidence-building first step towards ending the arms race. Similar to ideas coincidentally developed by Nelson A. Rockefeller, the Open Skies proposal directly addressed the central issue of safeguards and inspection which the National Security Council held as the Administration's first priority. Because the Russians would almost certainly reject the Eisenhower plan on the grounds that it violated national sovereignty, Open Skies may have had a second purpose: to quiet European fears over stationing American nuclear warheads in Europe.[82]

On the same day that Eisenhower proposed Open Skies, Bulganin reiterated the Soviet proposal for the establishment of control posts at major sea and airports, at railway junctions, and along main highways, in order to prevent

surprise attack. Khrushchev, on the other hand, virtually rejected Open Skies outright as nothing more than a spy system. The Russians, however, offered no new disarmament proposals at Geneva.

"OPEN-SKIES" OVER NUCLEAR FACILITIES

From the Commission's point of view, it was just as well that the Russians did not embrace the Open Skies proposal because the Commission had its own serious reservations about the President's plan. The Commission's concerns came to light when Arkady Sobolev, Soviet representative to the disarmament subcommittee, inquired whether nuclear weapons were included in Eisenhower's plan. The Russian's question was reasonable, and as Sobolev explained, consistent with the Soviet Union's desire to outlaw atomic and hydrogen weapons and to discontinue nuclear testing. Stassen, recently appointed to the disarmament subcommittee by the President and uncertain how to respond, announced that the United States had placed a "reservation" on all of its "pre-Geneva substantive positions" pending review of United States policies. Stassen's announcement was certainly candid, but it also squandered some of the President's hard-won propaganda victory by throwing in doubt American policies and western solidarity.[83] Ironically, both the Russians and the Commission were able to exploit the uncertainty created by Stassen's faux-pas.

When Stassen admitted that American disarmament policy was under review, he all but announced that the United States held "reservations" concerning its previous support of French and British positions. This apparent break in Western solidarity allowed the Russians to regain the initiative by offering numerous "first steps" to disarmament, confident that the NATO allies were in no position to respond positively. In his formal reply to Eisenhower on September 19, Bulganin pointedly noted that Stassen had been unable to clarify the American position. Did the United States still accept the 1952 Anglo-French proposals on force reductions? Was the United States willing to discuss control of atomic weapons? Would the United States also consider Soviet proposals for ground control posts? All Stassen would discuss, Bulganin complained, was aerial photography and exchange of "blueprints," which unfortunately included only the United States and the Soviet Union. To be workable, Bulganin suggested, Open Skies would have to include all allied nations, east and west.[84] By sly implication, Bulganin tweaked the Americans for refusing to recognize the Chinese communists, and including them in the disarmament negotiations.

Sobolev's question and Stassen's "reservations" also enabled the Commission to seek exemption for its facilities and programs. Strauss was especially worried that if the United States were obligated to disclose nuclear stockpile figures, the Russians would be able to calculate production rates by extrapolating from any two stockpile reports. Secondly, Strauss was afraid that the Soviets might be able to improve their bomb design significantly by studying photographs of American thermonuclear weapons. He asked that the President be alerted to these problems so that Eisenhower's intentions for Open Skies could be clarified.[85] Before Strauss could take his questions to the President, disaster struck the Administration. On September 24 while on vacation, Eisenhower suffered his first heart attack.

Stunned, the National Security Council nevertheless met on October 13 to hear Stassen's recommendations based on his discussions with the U. N. Disarmament Subcommittee. It was possible, Stassen thought, that the Russians might initially accept limited Open Skies over a band of territory 100-200 miles wide. Under the circumstances, Strauss was hardly in a position to press vigorously the Commission's case against including nuclear weapons and facilities.

Dulles demurred, however, and virtually answered the Russians and the Commission by expressing doubt whether the President's Open Skies concept was "divisible." The problem with limited air inspection, Dulles suggested, was that the Russians might accept a modest plan with the hope that it would never have to be expanded. Obviously melancholy, perhaps discouraged, Dulles compared Open Skies with Atoms for Peace. Both ideas had been offered by Eisenhower primarily with the hope of improving the climate of international relations. In neither instance had the President fully appreciated the technical difficulties his proposals raised for inspection and safeguards. Vast technical problems would have to be solved, Dulles predicted, before any kind of worldwide system for arms inspection and control, including the exchange of blueprints and other military information, could be established. All the same, Dulles mused, the President's Geneva offer had "put the Russians on the hook." Dulles wanted to keep them there and thought it inappropriate to make any limited deal with Moscow until Eisenhower could make his own views of the matter known.[86]

Just prior to the Geneva foreign ministers' conference called in November 1955 to discuss arms control, Stassen submitted to the National Security Council his "Proposed Policy of the United States on the Question of Disarmament." Stassen identified three priority objectives of the United States: (1) to open up the Soviet Union and other communist-controlled countries to effective inspection, (2) to prevent the proliferation of nuclear weapons to other nations, and (3) to inhibit the development by the Soviet Union of intercontinental missiles capable of delivering nuclear weapons. To achieve these aims, Stassen endorsed Open Skies, a modest reduction in conventional armed forces, the prohibition of the production of nuclear material for any purpose other than peaceful uses, and expanded scientific and cultural exchanges. Stassen also suggested that space satellites and intercontinental missiles be developed only through international collaboration for peaceful purposes, and not be tested or produced for weapons. Although the United States should agree neither to reduce nuclear stocks nor to withdraw from overseas bases, Stassen recommended that a ban on nuclear testing should be part of a comprehensive agreement.[87]

Stassen's support of a nuclear test ban virtually insured that the Commission would raise serious objections to the proposed disarmament policy. The Commission supported Stassen's basic principles and premises, although Strauss noted that Stassen had not made clear whether his three priorities were offered in addition to, or as a substitute for, policy objectives outlined in previous reports. Confusion, however, was not the Commission's major concern.

Writing on behalf of the Commission, Strauss outlined the chief deficiencies of Stassen's plans. Surprisingly, the Commission's first objection was that Red China was not included in the proposed agreements. The Commission's motives in raising this sensitive issue may have been mixed. On the one hand, the Commission was on solid ground when it argued that no comprehensive inspection and control system could exclude the People's Republic of China. On the other hand, given the Administration's intransigence over diplomatic recognition of Red China, the Commission's insistence that an effective agreement required Chinese participation virtually precluded a comprehensive treaty. Although the Commission's argument for including Red China may have been a gambit designed to impede negotiations (the Russians had used the same tactic), the Commission was supported in this position by Allen Dulles of the Central Intelligence Agency.[88]

Strauss' second reservation touched closest to the Commission's fears. For political reasons, the Commission could not categorically oppose a nuclear test ban, but Strauss forcefully argued "that the suspension of nuclear tests should

be listed as one of the items to which the United States will not agree except as part of the final phase of a comprehensive program for the limitation of armaments." On this point, the Joint Chiefs of Staff essentially concurred with the Commission, while Secretary of Defense Wilson more obliquely urged the implementation of Open Skies as the first and central objective of United States disarmament policy, subordinating all other goals to that end.[89]

On the question of inspection and verification, Strauss and the Commission were in accord with other commentators. Specifically, Strauss predicted that Stassen's plan would place too great a burden on the International Atomic Energy Agency, whose goal would include establishing safeguards to prevent use of nuclear materials for military rather than peaceful uses. Here, John Foster Dulles was closest in agreement with the Commission. Stassen's outline of an inspection and control system was so general, Dulles complained, that it did not provide the necessary details to evaluate the policy suggestions which should have been derived from the effectiveness of the inspection system itself.[90]

At the tenth General Assembly of the United Nations, Henry Cabot Lodge echoed Dulles' sentiments publicly. Inspection and control were the central issues in disarmament, Lodge stated, and had been ever since 1946. Now Lodge emphasized that the problem had become more difficult and urgent because large stocks of nuclear materials could be hidden beyond the range of any known detection device. Nevertheless, India's delegate V.K. Krishna Menon introduced a resolution calling for the immediate suspension of nuclear testing. Although the General Assembly did not adopt the Indian resolution, it unanimously accepted one sponsored by the United States and seven other nations proposing that the United Nations establish a committee to study the effects of atomic radiation on human health. Thus Lodge succeeded in his attempt to use a resolution to diffuse international anxiety over the health effects of radioactive fallout. By and large the American goals were achieved on December 16 when the General Assembly by a vote of 56-7, against Russian opposition, urged the Disarmament Commission's subcommittee to give priority to such confidence-building measures as Eisenhower's Open Skies plan and Bulganin's ground inspection proposals while continuing to search for feasible measures which adequately safeguarded disarmament agreements.[91]

In the midst of the United Nations debate on disarmament Strauss urgently appealed to Eisenhower and Dulles not to endorse a test ban except as part of the final phase of disarmament negotiations. Strauss stated his unequivocable belief that the Soviet campaign for a testing moratorium was a "coldly calculated maneuver" to overcome America's superiority in nuclear weapons. Although Strauss believed that the United States held a lead over the Soviet Union in nuclear weapon technology, in event of a test ban he predicted that the Russians could overtake the United States through espionage, unmitigated research and development, and clandestine testing. Meanwhile the momentum and vitality of the American testing program would be lost. If a test moratorium were adopted as one of the first phases of disarmament, Strauss feared the Soviets would deliberately stall subsequent negotiations as a tactic to gain time for their own arms buildup. Even should the United States detect a violation of the test moratorium, Strauss believed it would be politically impossible to convince the world of Soviet duplicity in the face of denials from the Kremlin. Consequently, Strauss recommended aggressive opposition to a test ban until a "comprehensive program for the limitation of armaments" had been negotiated.[92]

Strauss' appeal contrasted sharply with that of Pope Pius XII. On December 24, 1955, the Roman Catholic Pontiff called for an end to the nuclear arms race in his Christmas message to the world. According to the Pope, the great powers

had to take three steps simultaneously: ban nuclear testing, outlaw the use of nuclear weapons, and control conventional armaments. The Pope's plea to end nuclear testing embarrassed the Commission. For once, Strauss could not dismiss a proposal as politically or ideologically motivated. In 1956 the question of a nuclear test ban would become a pressing public issue.

NOTES

1. Kuboyama died on September 23, 1954, of hepatitis contracted while he was recovering satisfactorily from radiation injury. Bugher to John A. Hall, April 6, 1955; Bugher to Masao Tsuzuki, April 5, 1955, both in AEC.

2. Holifield to Eisenhower, March 26, 1954, AEC.

3. Lawrence Freedman, The Evolution of Nuclear Strategy (New York: St. Martin's Press, 1981), pp. 81-88; Townsend Hoopes, The Devil and John Foster Dulles (Boston: Little, Brown and Company, 1973), pp. 193-201; John Foster Dulles, "Policy for Security and Peace," Foreign Affairs 32 (April 1954), 353-64; Note by the Executive Secretary to the National Security Council on Basic National Security Policy, NSC 162/2, Oct. 30, 1953, Foreign Relations of the United States, 1952-1954, Vol II, National Security Affairs (Washington: Government Printing Office, 1984), pp. 577-97.

4. Strauss later amended this statement to "put out of commission." Excerpts from President Eisenhower's Press Conference, Wednesday, March 31, 1954, AEC. New York Times, April 1, 1954, p. 1; Robert A. Divine, Blowing on the Wind: The Nuclear Test Ban Debate, 1954-1960 (New York: Oxford University Press, 1978), pp. 12-13 (hereafter cited as Divine, Blowing on the Wind).

5. James R. Killian, Jr., Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology (Cambridge: MIT Press, 1977), pp. 67-71.

6. ODM Planning for Dispersal of Facilities, AEC 540/15, June 4, 1954, AEC.

7. Flemming to Strauss, May 26, 1954, in AEC 540/15, AEC.

8. Rabi to Strauss, June 3, 1954, AEC.

9. Division of Biology and Medicine, Conference on Long Term Surveys and Studies of Marshall Islands, July 12-13, 1954; Compensation to the Japanese Government on the Fukuryu Maru Case, AEC 730/4, June 11, 1954; ACBM 45, June 25-26, 1954, all in AEC.

10. Divine, Blowing on the Wind, pp. 21, 27-31; CM 957, Feb. 3, 1954; Murray to Strauss, Feb. 2, 1954; Murray to Eisenhower, Feb. 5, 1954, all AEC.

11. Dulles to Eisenhower, April 6, 1954, handwritten note in Eisenhower folder, LLS.

12. Proposal by Government of India for Moratorium on Weapons Tests, AEC 226/39, May 3, 1954, AEC. See also Statement by the Indian Prime Minister (Nehru) to Parliament Regarding Nuclear Tests [Extracts], April 2, 1954, Documents on Disarmament, 1945-1959, Vol. I, 1945-1956 (Department of State Publication 7008), pp. 408-11 (hereafter cited as Documents on Disarmament); Divine, Blowing on the Wind, pp. 18-31.

13. National Security Council, Summary of Discussion, Meeting 195, May 6, 1954,(hereafter cited as SNSC) DDE; Questions Concerning Weapons Tests, AEC 226/40, June 8, 1954, AEC.

14. SNSC 199, May 27, 1954, DDE.

15. SNSC 203, June 23, 1954, DDE; Teller and Bradbury to the General Manager, June 11, 1954, AEC.

16. Disarmament chronology and Memorandum--Disarmament Negotiations, Oct. 1956, LLS; SNSC 203, June 23, 1954, DDE.

17. Strauss to File, June 28, 1954, LLS.

18. D. C. Borg et al., Radioactive Fall-out Hazards from Surface Bursts of Very High Yield Nuclear Weapons, Technical Analysis Report - AFSWP 507, May 1954, p. iii, DOE History Division.

19. J. K. Mansfield to P. F. Foster, Aug. 19, 1954; Draft Statement by Chairman, Atomic Energy Commission, for Presentation in Executive Session, JCAE, March 24, 1955; Conference on Long Term Surveys and Studies of Marshall Islands, July 12-13, 1954, all in AEC. The other panelists were Bernard Brodie, William W. Havens, Jr., Frederic de Hoffman, Lt. Gen. Elwood R. Quesada, Herbert F. York, and Col. Paul T. Preuss as executive secretary.

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NEW DATA ON FALLOUT

By the end of 1955 the Commission's laboratories and headquarters staff were beginning to publish a substantial amount of data on radioactive fallout from nuclear testing. The Commission's Nineteenth Semiannual Report to the Congress in January 1956 contained a fifteen-page summary of recent findings on the long-term effects of fallout and brief descriptions of research sponsored by the Commission on radiation effects. More authoritative and detailed was a paper published in a scientific journal by Gordon M. Dunning, a health physicist in the division of biology and medicine. Dunning presented data on the blast, thermal, and radiation effects of nuclear detonating and discussed the radiation hazards posed by internal emitters such as strontium 90 and iodine 131.[4] He concluded that the hazards of testing were negligible up to that time.

Of much greater public interest was a paper which Libby presented at Northwestern University in January 1956 on "Radioactive Fallout and Radioactive Strontium." Libby's lecture was especially valuable to those outside the atomic energy establishment because for the first time it openly presented data gathered in Project Sunshine. In fact Libby explained the background of the project and described the worldwide sampling network that had been created to gather data on fallout patterns for strontium 90. Libby contended that the major part of bomb debris from high-yield tests reached the stratosphere, where it would be suspended for about a decade before it slowly descended to earth. Because strontium 90 has a relatively long half-life - twenty-eight years - most of the test debris, Libby admitted, would eventually enter the earth's biosphere, where it could reach the food chain and pose a potential danger to children through cow's milk.

Libby reported a recent estimate that the maximum permissible concentration of strontium 90 in the human body was about one microcurie per 1,000 grams of calcium.[5] To help calculate total body burden, scientists had devised a convenient measure called a Sunshine unit, which was 0.001 of the permissible adult body burden. Thus 10 Sunshine units were comparable to natural background radiation. One thousand Sunshine units were not expected to produce any visible skeletal damage, while 10,000 units might be hazardous. Children under seven years of age were most susceptible to strontium 90, while absorption among adults over forty was negligible. Measurements made in Houston, Texas, on bones of deceased children indicated an average strontium 90 content of 0.4--0.6 Sunshine Units.[6]

Libby sought to reassure his audience that the hazard from testing, if continued at the prevailing rate, would be insignificant. Despite the problems with the Castle/Bravo shot, Libby insisted that the weapon tests were conducted with great attention to the dangers of local fallout. In addition, scientists in Project Sunshine, who had collected fallout from gummed papers, milk and cheese, alfalfa, animal meat and bones, and even human cadavers, projected that worldwide fallout would be dispersed rather evenly, with slight concentration in the middle latitudes, principally by rains, morning mists, and fogs. Most of the fallout was dumped into the seas, drained into rivers and lakes, or washed into the top two or three inches of soil where it was held "very tenaciously." According to Libby's calculations, even if all the bomb debris distributed uniformly around the world were to reach the biosphere, there would be little risk to human beings. As it was, only a small fraction of the strontium 90 accumulated in human bones. "On the basis of the information [we have] obtained," Libby declared, "it is possible to say unequivocably that nuclear weapons tests carried out at the present time do not constitute a health hazard to the human population. . . ."[7]

Libby's "unequivocable" confidence in the safety of nuclear testing was not universally shared, however, even by the other Commissioners. Murray, for one, questioned the accuracy of some of Libby's information and openly challenged the wisdom of taking such a positive position in the Commission's Semiannual Report. Ultimately, the Commissioners adopted a much less categorical statement, noting in the section on "Long Term Effects of Fall-out From Nuclear Weapons" that the subject was "necessarily one in which the conclusions may vary over a wide range." The report conceded that estimates of inquiry from strontium 90 were based on data extrapolated from the known effects of radium on the human skeleton. Because injury due to strontium 90 had never been observed, there remained "degrees of uncertainty" over what concentration might actually produce damage.[8]

FALLOUT AND THE HAZARDS OF TESTING

Health effects from fallout were not the only "degrees of uncertainty" that plagued the Commission in January 1956. The general advisory committee learned from Charles L. Dunham, the new director of the Commission's division of biology and medicine, that only 3 percent of the estimated debris from the Castle tests could be accounted for worldwide. The Commission estimated that 90 percent of the Castle fallout had dropped into the ocean, leaving only 10 percent for stratospheric deposition. The British, on the other hand, estimated that 60 percent of the strontium 90 produced from megaton explosions remained in the stratosphere. Furthermore, British figures were six to ten times greater than the American estimate if the concentration in temperate regions with high rainfall was considered. If the British calculations were correct, according to Dunham, maximum permissible body burden would be reached after exploding 110-170 megatons of fission weapons, rather than the American estimate of 11,000-17,000 megatons. Finally, Dunham concluded that health standards had been set for adults, but that effects on babies and children were not "known with equal certainty."[9]

Libby repeated his Northwestern University speech almost verbatim before a House subcommittee on government operations, which was receiving testimony on "Civil Defense for National Survival." Questioned closely by Congressman Holifield, Libby repeated his unequivocable assurances that nuclear weapon testing was safe. Later, when the Commission discussed the December 1955 program status report to be sent to the Joint Committee, Murray again suggested adding a qualifying introductory paragraph to the section on fallout to the effect that the information represented the best, but not necessarily the definitive, estimates of the staff. This time the Commission rejected Murray's amendment by a three-to-one vote.[10] For the time being Libby's public analysis of the global fallout hazard from testing went essentially unchallenged.

When Ralph Lapp testified before Holifield's subcommittee, he complimented Libby for his impressive statement. In fact, Lapp used Libby's data to estimate the strontium 90 hazard of local fallout. Urging the Commission to publish the actual measurements on Rongelap, Lapp postulated that local hazards from strontium 90 could be serious. He observed that the persistence of radiation effects were subtle and insidious. Madame Joliot-Curie had recently died of leukemia and earlier her mother, Marie Curie, had succumbed to radiation effects. Lapp, nevertheless, was more concerned about the dangers of nuclear warfare than he was about the hazards of testing.[11]

As Lapp's testimony clearly indicated, the Commission was walking a fine line between justifying continued testing and informing the American people of the dangers of radioactive fallout in nuclear warfare. To counter increasing public opposition to further weapon tests, Libby proposed writing an

unclassified technical paper on radiostrontium fallout which would outline the scientific data compiled by Project Sunshine. The Commission could not indefinitely argue that testing was safe, Libby stated, without declassifying the statistics upon which its conclusions were based. The general advisory committee agreed with Libby and recommended that "the flow of such information to the public domain be accelerated."[12] Such openness, Libby reminded the Commissioners, "has brought us the freedom to proceed with Redwing," the Pacific test series which included the first dropping of a hydrogen bomb from an airplane. Release of the Sunshine data, however, would also permit foreign governments to infer that American tests had yielded fission debris from at least twenty-four megatons of detonations. In the interests of the testing program, the Commission decided that neither American security nor the common defense would be jeopardized by releasing the Sunshine data through Libby's April 20 address to the American Philosophical Society in Philadelphia.[13]

DULLES' ASSESSMENT OF NUCLEAR ARMS

John Foster Dulles was becoming increasingly alarmed in January 1956 by what he described to Eisenhower as trends unfavorable to the United States in the development of nuclear weapons. The Soviet Union was already achieving the capacity to devastate the United States by surprise attack. In a few years, Dulles predicted, the Russians in a single stroke could virtually obliterate America's industrial power and seriously impair the Nation's capacity to retaliate. Thus the United States' own nuclear deterrent would be weakened. Conversely, Dulles also worried that the strategy of "massive retaliation" itself was becoming obsolete as the United States' ability to wage devastating nuclear warfare increased. He speculated that reluctance to use powerful nuclear weapons might begin to depreciate the value of the United States as an ally, undermine western confidence in "collective defense," and reduce the availability of foreign bases to American forces.[14]

Most seriously, Dulles acknowledged that nuclear weapon stockpiles were expanding at such a pace as to endanger human life on earth, or at least vast segments of it. He told the President that the world cried out for statesmanship that would command nuclear power to serve humanity, not destroy it. Furthermore, Dulles thought that most people looked to the United States with its spiritual power, intellectual resourcefulness, and dedication to peace to lead the way to the peaceful atom. Dulles also believed that Eisenhower, who had inspired great hope with his Atoms-for-Peace and "open skies" proposals, was uniquely qualified to assume international leadership. The trouble was that both ideas had largely lost their popular influence because Atoms for Peace, for all of its promise, would not halt the nuclear arms race. Neither had "open skies" nor any other inspection proposal been linked to any broad American plan for nuclear disarmament. Thus the Soviet Union, with its "ban the bomb" propaganda, had been able to challenge America's moral leadership by claiming that the Russians wanted to end the thermonuclear danger. Americans, on the other hand, were widely perceived as stalling on nuclear disarmament while trying to think up good reasons for continuing the nuclear race, or even expanding it. The irony for Dulles was that the communists, "whose creed denies moral principles," might subvert America's moral leadership.

Given the Soviet Union's unreliability and the lack of international controls and organization, the United States, in Dulles' view, had no alternative but to maintain an arsenal of nuclear weapons. Dulles saw virtually no possibility of finding a technical solution to the disarmament problem, and there was almost no chance that the Russians would submit to the comprehensive inspection system that the United States would demand before agreeing to

substantial disarmament. Indeed, slim hopes vanished when Americans would not state categorically in advance that, should inspections prove technically feasible, the United States would, in fact, drastically reduce nuclear arms. Dulles concluded that the major obstacles to nuclear disarmament were not technical, but political. To that end, Dulles hoped to expand the United Nations' peacekeeping role by outlawing national stockpiles of atomic weapons, and providing the United Nations Security Council with sufficient atomic weapons to counterbalance any threat of nuclear attack by a single nation. Probably inspired by Stassen, Dulles' observations were still vague and speculative. Nevertheless, he shared them with Eisenhower, who apparently welcomed even the rough ideas of Dulles.

Eisenhower agreed with his Secretary of State that it was essential for the United States to recapture the political initiative in the debate over nuclear disarmament, although the President was not quite so willing to give up the search for technical solutions. Rather, Eisenhower suspected that political and technical proposals would have to complement each other. Certainly, technically feasible inspection schemes would strengthen any politically acceptable disarmament treaty. As anxious as Dulles was to counter Soviet propaganda, Eisenhower ignored the suggestion that disarmament might be enforced through the United Nations.[15]

A NEW REJECTION OF DISARMAMENT

Despite rebuffs during 1955, Harold Stassen continued to develop a comprehensive American policy on arms control and disarmament. Sharing some of his views with Senator Hubert H. Humphrey's disarmament subcommittee on January 25, 1956, Stassen described testing as a necessary consequence of the arms race. As long as the Cold War continued, weapon testing would be "essential" for national security.[16] Although satisfied with Stassen's defense of testing, the Commission did not share his long-range hope that all nuclear material could be restricted to peaceful purposes. Not only would it be almost impossible to implement such a proposal, but as Commissioner Vance observed, Stassen's goal might also preclude developing military propulsion reactors for ships or other vehicles. In addition, Strauss pointed out that large amounts of nuclear materials would be needed for purely defensive uses in antiaircraft missiles.[17] When the National Security Council met the following day, January 26, it took no action on Stassen's report.[18]

BRITISH MOVE TOWARD A TEST BAN

Testing became a major item of discussion when British Prime Minister Anthony Eden visited Washington in February. Eden asked whether, as a move in the Cold War, the United States and the United Kingdom could propose to limit, control, or restrict testing. He frankly admitted that the idea would help him politically in the United Kingdom where apprehension over fallout was mounting. Eden also believed that there was little chance that the Russians would agree to control testing.

Strauss did not like Eden's suggestion. He lectured Eden that all nuclear testing to date had added to the environment only a very small fraction of the radiation generated by natural sources; the differences, Strauss claimed, were no greater than the increases in exposure encountered in going from sea level to 5,000 feet. Furthermore, thermonuclear technology did not require the testing of ever larger bombs, but rather the development of more efficient, lighter weapons such as those used against aircraft.[19]

When Strauss estimated that the National Academy of Sciences would require at least two years to complete all of its fallout study, Eden complained that

lack of concrete conclusions in preliminary reports would probably increase pressures in the United Kingdom to stop testing. At a minimum, Eden wanted to reassure the British public that the United Kingdom and the United States were jointly studying the matter. Strauss reminded Eden that the two countries were cooperating in the study of radiation effects, and promised to send the Prime Minister Libby's recent speeches on fallout and other pertinent information planned for release.

According to Dulles, there were two possible reasons for limiting testing: first to protect health, and second to advance arms control. Dulles reassured the British that the United States would stop testing if it were proven dangerous to humanity. Nevertheless, announcing that the United States and the United Kingdom were discussing a test limitation would only give credence to the belief that testing was hazardous. In Dulles' opinion, a joint study could not conclude that testing was safe without producing "a very bad public reaction." On the other hand, Dulles doubted that there would be serious technical difficulties in devising a workable test limitation if humanity was actually being injured by testing.

Dulles believed that any plan to limit testing as a first step toward arms control presented an entirely different set of problems. Unless testing were banned entirely, Dulles predicted great difficulty in drawing a line between permissible and non-permissible tests, and in establishing effective controls. The Castle/Bravo shot in 1954 had dramatically illustrated the difficulty in estimating yields. A cheating nation, Dulles speculated, could merely claim that a nonpermissible test had been the result of an unintended large yield. Cheating could also occur in China or Tibet where responsibility for the tests would not be clear. As a step towards arms limitation, Dulles vigorously concluded, "test limitation would be an extremely fallacious approach."[20]

THE ARMS RACE: AN "AWFUL PROBLEM"

Following Eden's departure, Eisenhower called an impromptu meeting of the National Security Council to discuss Stassen's proposals. Although Eisenhower complimented Stassen for his hard work, the President feared that there was nothing really new to propose, except possibly Strauss' idea of designating strips of territory in the United States and Russia where inspection could be tried on a small scale. Strauss also suggested that while earmarking 20,000 kilograms of enriched uranium for domestic use the President should designate an equal amount for peaceful uses around the world.

Eisenhower thought that these suggestions were useful but he was disappointed at the lack of progress toward disarmament. With elaborate public announcements, radio addresses, messages to Congress, speeches to the United Nations, and high-level negotiations with the Russians, the Administration seemed to be using a sledgehammer to drive a tack. Profoundly discouraged, Eisenhower saw few ways to avoid the gradual drift toward war. Nonetheless, the President felt the moral obligation to seek some alternative to the arms race. He specifically asked the National Security Council to think about "this awful problem," and to offer ideas on how to channel mankind towards peaceful pursuits and the atom into peaceful uses. If the H-bomb could be banned, Eisenhower mused, the world would be better off. He also suspected that defense planning overlooked the fact "that nobody can win a thermonuclear war." In a nuclear war with the Soviet Union "what is left of either country after the first seventy-two hours?" the President asked. Eisenhower implored his advisors to search their hearts and minds for some way out of the collision course on which the two nations seemingly were embarked.[21]

OPEN SKIES: A FADING HOPE

Despite Eisenhower's plea, Stassen and Strauss squabbled over how best to answer Bulganin's letter of September 19, 1955, which had evaluated the President's Geneva proposals. Bulganin had characterized Eisenhower's ideas as "sincere," but he criticized "open skies" because the plan for aerial photography did not include the allies of each country. Furthermore, pushing the standard Soviet position, Bulganin complained that Eisenhower had ignored reduction of armaments and the prohibition of nuclear weapons.[22] In order to be responsive to the Soviet's objections, Stassen suggested that the United States pledge its support to the eventual peaceful use of all nuclear material.

Strauss and the Commission objected vehemently to Stassen's proposal. Not only would a pledge to use nuclear material solely for peaceful purposes damage the weapon program, but it would also preclude the development of nuclear propulsion for submarines and surface ships. With Dulles moderating Strauss' strong protest, Eisenhower persisted in expressing his "ultimate hope . . . that all production of fissionable materials anywhere in the world [would] be devoted exclusively to peaceful purposes."[23]

In February 1956 infighting over Eisenhower's nuclear policies must have tried the patience of Administration insiders, who were not even certain whether the President would run for reelection. On the eighth, Eisenhower told reporters he would announce his decision before the end of the month. On February 14, the same day that Nikita Khrushchev denounced Joseph Stalin at the 20th Party Congress, doctors at Walter Reed Army Hospital advised the President that he should be able to lead an active life for another five to ten years. Buoyed by the good news and convinced by his close advisors that no other Republican could be elected in 1956, Eisenhower on February 29 announced his decision to run again for the presidency.[24]

Shortly thereafter, Stassen left Washington for London where the disarmament subcommittee would meet for almost two months, from March 19 to May 4. In London Stassen presented the American modified "open-skies" plan, which melded limited aerial inspection with aspects of Bulganin's ground inspection proposal.[25] For Khrushchev, who was also present in London, Eisenhower's obsession with aerial photography was troubling. The Soviet Union did not even have a complete photographic record of its own country, Khrushchev admitted. Whimsically, he claimed that the Russians had little interest in aerial photographs, whether of the United States, Monaco, or Peru. Still, Khrushchev thought the Soviet Union could accept some aspect of "open skies" if the Americans insisted. In addition, he reemphasized that the Russians had dropped their position on banning nuclear weapons because they knew the United States would never agree. Moreover, Khrushchev complained that whenever the Russians had tried to move toward adopting Western proposals over the past years, they had discovered that the West kept moving away.[26]

THE MORALITY OF MEGATON WEAPONS

Now a persistent goad to the Commission and the Administration, Commissioner Murray renewed his call for a limited test ban on February 23, 1956. Testifying before a closed session of the Joint Committee, Murray recommended that the United States unilaterally cease testing large hydrogen weapons, set an upper limit on the size of thermonuclear bombs to be placed in the stockpile, and intensify development of a wide range of small, tactical weapons. Murray feared that unless the Administration changed its policy, the United States would develop the capacity for destroying the world in a full-scale nuclear war. He had also seen estimates provided to the National Security Council that the Russians might produce a single weapon whose

destructive power was greater than the entire American stockpile. To Murray, the arms race had become sheer madness. No matter what the Russians might develop, Murray was convinced that the United States did not need to experiment with larger, more destructive weapons. Murray was not against testing, whose risks he thought were slight, but rather opposed stockpiling huge numbers of megaton super bombs whose destructive capability might contaminate the entire earth.

Despite the efforts of the Commission's division of biology and medicine, Murray argued that not enough was known about radioactive debris, especially "one of its most insidious components, radiostrontium . . . . Uncertainties about the rate of fallout," he testified, "about variation in world distribution, about the mechanism of take-up into food and into the body, all combine to render definitive answers all but impossible at this moment." One could imagine, Murray warned, "the impact on the medical profession as a whole in this country if it knew the magnitude of our mounting stockpile and the potential hazards associated with its use."

Murray proposed that the United States unilaterally suspend thermonuclear testing. Conceding that this was his personal opinion, shared neither by the Commission nor by the Joint Chiefs of Staff, Murray, for military and moral reasons, also opposed testing and stockpiling megaton hydrogen bombs. From the military perspective Murray contended that megaton-size weapons would not prove useful in warfare. "Atomic superiority does not consist solely in the possession of bombs bigger than those possessed by the enemy. It also rests upon the possession of such a wide variety and range of small atomic weapons that we shall be able to cope successfully with all the various military contingencies that might arise. Superior strength means flexible strength; and this flexibility can only be achieved by advances in the field of small weapons."

Morally, Murray believed that "the traditional canons of justice that govern the waging of warfare are still valid in the nuclear age." Although he was not expansive on his moral arguments to the Joint Committee, like Eisenhower, Murray saw the interrelationship between atoms for peace and atoms for war, or between nuclear weapons and industrial nuclear power. United States programs in both fields were directed toward the same ends -- the furtherance of justice and peace. Virtually elaborating the President's own concerns, Murray identified America's most pressing problem as the balancing of military and peaceful programs in such a way that each individually and both together served the common purposes. Moreover, Murray believed that as the benefits of nuclear power became universally shared the world would come to appreciate that "God in His almighty power and goodness has given us the secret of atomic energy for purposes of peace and human well-being and not for purposes of war and destruction."[27]

Not surprisingly, Murray's testimony to the Joint Committee infuriated Strauss. Fearful that the issue might cause the President trouble at his next news conference, Strauss warned Hagerty that Eisenhower might be questioned about testing. Murray knew perfectly well that the tests were not designed for large weapons, Strauss advised Hagerty, but for new applications, particularly in defensive and low-fallout weapons. The Atomic Energy Commission was run like a business, Strauss insisted, which included keeping Murray fully informed of all developments. For some reason, according to the chairman, Murray had a psychopathic obsession about being excluded from vital information.[28]

Strauss' warning was timely and helpful to the President. At his March 21 press conference, Eisenhower was asked to comment on Ralph Lapp's contention that it was possible to construct a suicide weapon so large that it could be

carried only by a freighter. Lapp obviously had access to sources similar to Murray's. Although Eisenhower did not answer the question directly, he admitted that there was a practical limit to the size of thermonuclear weapons. There was an old saying, the President continued: "you do not drive a tack with a sledge hammer."[29]

Suspecting that the President supported his views on the development of tactical weapons, at least in principle, but receiving no satisfaction from the Commission or the Joint Committee, Murray took his case to the public on April 12, 1956, when he testified before Senator Humphrey's disarmament subcommittee. Because in open hearings Murray could not statistically document his arguments that American nuclear firepower and stockpiles were already dangerously high, his moral arguments for unilateral suspension of thermonuclear tests and the development of tactical weapons seemed even more accentuated. Acknowledging the military principle that armaments should be demonstrably useful in actual warfare, Murray described an even higher principle that the use of force is always subject to the dictates of moral conscience. In Murray's opinion the sheer brilliance of America's technical achievements in nuclear weapons had tended to dull the nation's moral sense. As a "nation under God," Murray testified, Americans should recognize their moral obligation to set limits on war and the use of force. Murray reiterated that he did not think testing as such was dangerous, but rather that he was horrified at the ethical implications of Dulles' doctrine of massive retaliation. In retrospect, Murray even confessed that he did not believe that the use of the atomic bomb against "the city of Hiroshima and its multitudes of innocent people could be justified on moral grounds."[30]

THE H-BOMB: A CAMPAIGN ISSUE

In the early spring of 1956, Adlai Stevenson, campaigning against Senator Estes Kefauver of Tennessee for the Democratic presidential nomination, spoke out against continued testing of hydrogen bombs. Inspired by Murray, Stevenson on April 21 proposed to the American Society of Newspaper Editors that halting H-bomb testing would be a dramatic expression of America's real concern for peace. Like Murray, Stevenson would end the tests unilaterally, but unlike the Commissioner, he did not propose buttressing the tactical stockpile. Stevenson borrowed liberally from Murray's moral arguments while virtually ignoring the fact that Murray had also warned against simplistic "ban-the-bomb" schemes.[31]

Stevenson's proposal, offered to the editors on Saturday, was almost immediately smothered by Russian actions. On Monday morning Nikita Khrushchev informed British businessmen that the Soviet Union was building a ballistic missile with a nuclear warhead. Probably unaware of Khrushchev's announcement in London, Kefauver, uncertain on how best to parry Stevenson, conceded that he "saw no particular good in having further H-bomb tests." Stevenson himself asserted that the Russians had given every indication that they would "go along" with his suggestion. After lunch on April 24, however, Republican Senators Thomas H. Kuchel of California and Styles Bridges of New Hampshire sharply criticized Stevenson's test-ban proposals as misguided. By mid-afternoon, Kefauver had modified his morning statement by insisting that he favored only a reciprocal test ban with the Russians. Stevenson, now sensing that he had committed a major blunder, attempted to counterattack by reaffirming his test ban proposal while charging that the Administration had been "dangerously dilatory" in developing guided missiles.[32]

Intentionally or not, the Russians had struck a major blow at Stevenson's campaign for the presidency without damaging his chances for the Democratic nomination. While campaigning vigorously for Florida's twenty-eight convention

votes a week later, Kefauver tried to capitalize on the issue by underscoring the folly of a test ban in the face of Khrushchev's boast. But rather than reaping much benefit, Kefauver only succeeded in emphasizing the extent of Stevenson's political isolation on the question of nuclear armaments.[33] In the long run, Eisenhower was the chief beneficiary of the issue.

In his news conference on April 25, Eisenhower emphasized what he described as the paradox in Stevenson's position: that the United States should accelerate the development of guided missiles while stopping research on the hydrogen bomb. In the President's words, "if you don't work on one and get the right kind of explosive to use there, why work on the other?" Agreeing that the paradox simply made no sense, the Washington Star thought it analogous to fashioning an artillery piece without bothering to design and produce shells for it. Or, as the Wall Street Journal commented, Stevenson could hardly have it both ways. How could America's supposedly weakened defenses be strengthened by hobbling the nation's primary weapons?[34]

At this point, Stevenson might have escaped with but a few minor bruises. Indeed, with the strongest press support coming from the Daily Worker, Stevenson virtually ignored the issue as his campaign for the nomination rolled into high gear during May. But questions concerning testing and the health effects of fallout would not disappear. Without mentioning Stevenson, Ralph Lapp warned that indefinite testing of nuclear weapons would endanger world health. According to Lapp, the Atomic Energy Commission had sugar-coated the bitter facts about fallout, and had been guilty of "double-talk with regard to the long-term hazards from nuclear detonations." Lapp praised Libby for publicly airing the issue on April 20 before the American Philosophical Society, but sharply disagreed with his conclusions. In fact the two men agreed only that strontium-90 was the chief long-term threat to human life.[35]

THE NATIONAL ACADEMY REPORT

On June 12, 1956, the National Academy of Sciences issued its report on "The Biological Effects of Atomic Radiation." Simultaneously, in London the United Kingdom Medical Research Council presented similar findings to Parliament. Indeed, although the two studies had been conducted independently, their release was coordinated for simultaneous publication in the morning papers on the next day.[36]

According to Libby, neither report presented findings not already known to the Commission and available in open literature. There were minor differences over the effects of strontium 90 which were no doubt the result of different methods of measuring radioactivity. Libby was also gratified that the reports generally agreed with the Commission's views, with the exception that the studies recommended additional reduction in permissible lifetime exposure to radiation. Libby did not anticipate, however, that the reports would necessitate any change in the Commission's positions on nuclear weapon testing, the Atoms-for-Peace campaign, or any other atomic energy program.

Both reports identified the genetic consequences of radiation as a paramount consideration. Most experts agreed that there was no threshold below which radiation did not threaten genetic damage. Thus, geneticists recommended lowering permissible exposure rates as much as practicable. The National Academy of Sciences now advocated an upper limit of 50 roentgens for individual persons up to age 30, or an average exposure of the population above natural background not to exceed 10 roentgens from conception to 30 years of age. In addition to natural background, the largest source of radiation to the population came from medical and dental X-rays and fluoroscopy. In comparison to the 30-year dose to the gonads which the average person received from natural

background (about 4.3 roentgens) and from X-rays and fluoroscopy (about 3 roentgens), the dose from weapon tests, if continued at the existing level, would have been 0.1 roentgen. Even if the test estimate was off by a factor of five -- 0.02 to 0.5 roentgens over 30 years -- fallout from weapon tests was dramatically less dangerous than radiation from medical uses. The National Academy Committee did not certify that nuclear weapon tests were safe, but implied that the risks from testing were minor. The Academy did warn, however, that even low levels of radiation could have serious biological effects which were directly proportional to the amount of radiation. Thus, many of the disastrous consequences of nuclear war could be implied from the lessons of peacetime use.[37]

The Commission welcomed the National Academy report and, with the exception of Murray, applauded its conclusions. When the Commission issued its semiannual report to the Congress, Murray refused to concur on the section pertaining to the hazards of fallout from radioactive strontium. The Commissioners concluded that "at the present level of weapons' testing, the present and potential contribution of strontium 90 to the world ecology is not a significant factor." The Commissioners thereafter summarized the findings of the Academy, and affirmed the need for additional research and study, including continuation of Operation Sunshine. Thus the report became the basis for justifying Commission programs and accelerating research into radiation effects. To the National Security Council the Commission emphasized the need for a broad research program on long-range hazards caused both by nuclear weapon tests and power plants. Again citing the National Academy of Sciences as well as the British Medical Council, the Commission advised the security council that there were still important data to be gathered on the implications of testing and warfare.[38]

THE DEMOCRATS AND NUCLEAR POWER

Much to the disappointment of Senator Anderson, the report of the McKinney panel in February 1956 did not give the Democrats ready ammunition to fire at the Commission's civilian power program, but it did provide a firm base from which to launch an attack. The ammunition was already available in two forms. The first was a bill introduced by Senator Gore in July 1955 which "authorized and directed" the Commission to construct six demonstration power plants, each of different design and located in a different geographical section of the country. The second was a statement by Commissioner Murray before the Joint Committee on February 23, 1956, proposing that the United States install at home and abroad power reactors with a capacity of two million kilowatts. Only in this way did Murray think that the Nation could establish "a commanding lead in the atomic power race."[39]

By the end of April 1956 Anderson was prepared for a series of hearings on legislation designed to remove the roadblocks which the McKinney panel had found on the highway to civilian nuclear power. As the new executive director of the Joint Committee he had selected James T. Ramey, a veteran Commission attorney, who in a decade at the Chicago operations office had gained an intimate knowledge of both Commission and industry efforts in reactor development. For technical support Anderson had also obtained the temporary services of Walter H. Zinn, who had just resigned after ten years as director of the Commission's Argonne Laboratory. In May Anderson held a seminar and hearings on providing adequate insurance coverage for power reactor owners and equipment manufacturers.[40]

The big guns were reserved for hearings starting the following week on the Gore bill and other means of "accelerating the civilian reactor program." To prepare for the public hearings Anderson held two secret executive sessions on

May 21 and 22 with officials from the State Department, the Commission, and the Central Intelligence Agency. In the closed sessions Anderson and his colleagues revealed their motivation for supporting the Gore bill. To be sure, the fight over public versus private power, growing distrust of Strauss, and a lack of confidence in industry's professed commitment to nuclear power were all involved. But the center of committee concern was Cold War competition with the Soviet Union. For hours the committee members tabulated and retabulated estimates of future nuclear power capacity in the Soviet Union and to a lesser extent in the United Kingdom and France. In the Cold War context the predictions were alarming. According to "intelligence estimates" the Soviet Union would have 400,000 installed kilowatts by 1958, 1,222,000 in 1959, and more than two million in 1960. In contrast the United States would have 60,000 kilowatts at Shippingport by the end of 1957. If all the power demonstration and independent projects were completed as proposed by industry, the United States would still have only 750,000 kilowatts of capacity by 1960. When it came out that the "intelligence estimates" were based on public statements by Soviet leaders, Strauss contended that these were not serious commitments reflecting Soviet capabilities. To use the Soviet figures to set the American goal might amount to chasing a chimera.[41]

In opening the public hearings later that week, Gore dramatized the Soviet threat. To lose that race, Gore said, would be "catastrophic." The United States had "a clear moral responsibility" to develop "this marvelous new source of energy. . . . to dispel the Soviet propaganda that we are a Nation of warmongers." But as the hearings continued, the testimony followed the now-familiar paths established in 1954 between the proponents of private and government development of nuclear power. Although Anderson, Holifield, and other Democrats supported the Gore bill, it soon became apparent that the proposal was too ambitious. Strauss pointed out that building six demonstration power plants, each of a different design and in a different geographic location, would be more costly in terms of money and talent than the huge Savannah River project. The idea of scattering reactors around the country also raised in Republicans the specter of a sinister attempt to build regional TVAs across the nation.[42]

Perhaps Gore had overstated the case for a federally supported nuclear power program, but there was no question that a groundswell of public sentiment was building for some kind of action to get the United States back in the international race for nuclear power. On the Democratic side Robert McKinney took up the issue in a ringing statement before the Overseas Press Club of New York on May 17 and later at the Joint Committee hearings. McKinney charged that the United States had been "backward" in promoting nuclear power, the most advanced, the most dramatic -- perhaps even the cheapest -- form of foreign aid. The problem, McKinney argued, was that the United States was too concerned about secrecy. "We have been afraid that other nations might misuse the information and the materials we would give them," he continued. But McKinney, who shared neither the Commission's sense of accomplishment nor the State Department's caution, thought risks from nuclear arms proliferation were small, particularly if the United States exported only nuclear power technology while keeping military application under lock and key.[43]

McKinney's speech seemingly stirred political embers. In reaction, C. D. Jackson, one of the original architects of Eisenhower's Atoms-for-Peace speech who was impatient with the subsequent pace of the program, offered Strauss an embittered history of failure and frustration since the President's glowing proclamation in December 1953. If Jackson's history was too harsh, he was not alone with McKinney in viewing the American program as too timid. Writing for

the atoms committee of the Federation of American Scientists, Herbert J. Kouts expressed the opinion that the United States was not moving fast enough. "Probably you are motivated here by a desire to fulfill the program in a straight forward, orderly way, as free from mistakes as possible," Kouts wrote to John A. Hall. "We on the other hand think that some mistakes in detail are allowable, if only greater speed can be bought this way."[44]

Significantly, during the spring of 1956 the Democrats did not criticize Eisenhower because his nuclear power plan was environmentally reckless or socially dangerous. Rather, following the lead of Anderson and McKinney, they chastened the Administration for not charging ahead far enough or fast enough. In May, hammering away at the Dixon-Yates theme, Senator Kefauver, on the campaign trail for the Democratic presidential nomination, charged that the United States had "fallen woefully behind" the Soviet Union, the United Kingdom, and France because the Eisenhower Administration had insisted that private industry be the exclusive developer of commercial atomic energy. Kefauver repeated his accusations a month later, more stridently blaming "Republican Freebooters" for falling behind in the international development of nuclear power.[45]

THE GORE-HOLIFIELD BILL

The revised bill that Gore introduced in the Senate on June 29, 1956, reflected a more considerate and temperate position than the original draft. The new version, which Holifield introduced in the House, contained no requirement that the plants be located in six regions or specified the number or types of reactors to be built. Instead the Commission would be directed to build large-scale plants at existing Commission production sites to provide electricity for those installations, to construct smaller experimental reactors at Commission laboratories, and to assist other nations in developing their own power reactors. With these changes, the Democratic majority easily passed the bill in the Senate on July 12, 1956.[46]

As the election-year session of Congress churned to its end in the last weeks of the month, the House debates loomed as decisive for the Gore-Holifield bill. The Democrats, still firmly in control, used hearings before the House Appropriations committee as an occasion to denounce both the Commission and the Administration for failing to mount a vigorous government program for developing nuclear power. When the committee submitted its report approving $440 million to fund reactor construction under the Gore-Holifield bill, it also published the transcript of the appropriation hearings, which contained more than three hundred pages of testimony, much of it excoriating the Commission and supporting the Gore-Holifield plan as a moral imperative. The Administration in the meantime marshalled its forces against the bill while private industry financed an advertising campaign against it.[47]

In seven hours of floor debate on July 24, 1956, the Democratic majority in the House struggled to maintain party ranks in support of the Gore-Holifield bill, but Congressman Cole's success in pushing through amendments favored by the Administration foreshadowed the final outcome. With twenty-seven Democrats not voting, and an equal number siding with the Republican opposition, the bill failed by twelve votes.[48]

This unexpected defeat killed all hopes for a nuclear power bill in the Eighty-fourth Congress. Ever since the formation of the McKinney panel sixteen months earlier, Senator Anderson had harbored visions of a well-articulated federal program for nuclear power development which the Democratic members of the Joint Committee might propose as a key plank in the party's platform for the 1956 elections. Now that dream was in shambles. Frustrated by the

Administration's refusal to accept any substantial increase in funding for the development of nuclear power, Anderson became ever more suspicious of Strauss' motives. He even convinced himself that Strauss was really opposed to nuclear power on any basis because it would threaten the economic interests of the Rockefellers, who he believed had vast holdings in fossil energy resources. Bitterly disappointed by the defeat of the Gore-Holifield bill, Anderson angrily withdrew two other bills that he had shepherded through the Joint Committee to encourage private participation in nuclear development -- one providing federal liability insurance for nuclear power facilities and the other amending the Public Utility Holding Company Act to exempt from its provisions power companies participating jointly in noncommercial nuclear projects. Both bills probably would have passed with little or no debate, but Anderson was determined to hold them hostage pending congressional action on a new version of Gore-Holifield in 1957.[49]

REDWING AND GENERAL GAVIN

Throughout the spring and into July 1956 the Commission conducted its Redwing series of nuclear tests at the Pacific Proving Ground. More than one dozen tests, as described by Strauss, were designed to develop defensive weapons against air and missile attacks.[50] Nevertheless, Redwing also tested America's first air drop of a multi-megaton hydrogen bomb, as well as provided the Commission its best opportunity since the ill-fated Castle/Bravo test to collect fallout data in the Pacific. The conduct of the tests was unaffected by scattered protests in the United States and abroad. On May 21 over Namu Island at Bikini an Air Force bomber dropped its thermonuclear payload which exploded at about 15,000 feet, and created minimal fallout which drifted northward over uninhabited ocean. Somewhat embarrassingly, through navigational error the pilot had missed his target by about four miles, but the miss was of little consequence either from a military, diagnostic, or safety point of view. In multi-megaton thermonuclear weaponry, a four-mile error did not mean that the target remained undamaged.[51]

A few days after the air drop General James M. Gavin, Army chief of research and development, used the Cherokee shot to illustrate the radiological power and significance of the hydrogen bomb. Under questioning from Senator Stuart Symington, Gavin confirmed that a recent article in Fortune was essentially correct: a large-scale thermonuclear attack on the United States would kill or maim some seven million persons and render hundreds of square miles uninhabitable for perhaps a generation. Even more dramatically, Gavin predicted that American retaliation against Russia would spread death from radiation across Asia to Japan and the Philippines. Or if the winds blew the other way, an attack on eastern Russia could eventually kill hundreds of millions of Europeans including, some commentators added, possibly half the population of the British Isles.[52]

After the subcommittee released Gavin's classified testimony on June 28, 1956, America's allies, the press, and the general public began to understand the startling implications of thermonuclear warfare. The impact on allied nations in Europe, the Middle East, and East Asia could hardly be underestimated as America's partners in Soviet containment and massive retaliation came to realize that they could become devastated victims of a United States-Soviet war. Gavin's statement also evoked a sharp protest from General Alfred M. Gruenther, Supreme Allied Commander in Europe, a post once held by the President himself. At the White House, Dulles, Strauss, and others decided that Eisenhower should try to counter the disastrous effects of Gavin's testimony by minimizing the danger of fallout.[53]

THE "CLEAN" WEAPON

The Redwing tests, seemed to the President's advisors to offer an ideal opportunity to calm public fears by stressing American efforts to develop weapons with reduced radioactive fallout. The development of so-called "clean bombs" presented the possibility of returning to the pre-Castle/Bravo era, when military planning focused on the blast and heat effects of nuclear weapons. There was a real question whether the clock could be turned back, but the White House gave the Commission the task of preparing a press release on "clean" weapons.

Although Strauss and his colleagues could appreciate the political and diplomatic considerations involved, the Commission was more concerned that any statement at all might compromise military secrets. Edward Teller warned that a reference to "clean bombs" could provide the Russians significant insight into the design of the United States' most advanced weapons. To reveal that the United States had developed a weapon that had very little fallout would alert the Russians to the fact that the United States had achieved a breakthrough in weapon design.[54]

White House desires to counter Gavin, however, overrode Commission reluctance to declassify some of its work on "clean" weapons. Strauss explained that a public statement would accomplish two purposes. First, the world would be assured that the United States was not obsessed with weapons of mass destruction. Secondly, Strauss believed that a press release would reduce public pressure for the cessation of weapon tests. The other Commissioners agreed that testing should be defended, but Libby remained leery of unnecessarily compromising design information. So did Eisenhower, who decided not to issue such an announcement himself because he did not want to field technical questions on nuclear weapons at press conferences.[55] The President had already mentioned in a press conference on April 25 that the Redwing series would test weapons with reduced fallout. To that extent, American intentions had already been revealed. At an informal meeting when Murray was absent, the Commission acquiesced to an urgent appeal from Dulles that Strauss become the Administration's spokesman on "clean" weapons.[56]

Strauss issued a brief statement about the results of the Redwing tests that same evening. As cryptically as possible, he noted the progress that the laboratories had made in localizing fallout. The tests had achieved "maximum effect in the immediate area of a target with minimum widespread fallout hazard." After assuring the public that large thermonuclear weapons did not necessarily produce massive fallout, Strauss concluded hopefully that Redwing had proven "much of importance not only from a military point of view but from a humanitarian aspect."[57]

Unexpectedly, Strauss' "Clean Bomb Statement," as it came to be called, caught a whirlwind. Opponents of nuclear testing might have been expected to dismiss it as the Commission's justification for further testing, but the bitterness of Senator Anderson's and Murray's reactions were surprising. Anderson called the release of the statement without informing the Joint Committee a "studied insult" to Congress.[58]

Murray was outraged because the Commission had approved the statement on July 19, after he had departed for a weekend at home in New York. For Murray, the incident was the latest, and among the most egregious efforts by Strauss to grab all power in the chairman's hands. Within the week, Murray appeared before the Joint Committee to repudiate the press release. He did not object so much to what Strauss had said, but rather to the fact that he had been hoodwinked into believing the President would make the statement. As it was, Murray had not been given the opportunity to express his views on an official statement by

the Commission. Before the hearing ended on July 23, 1956, Anderson, Murray, and Strauss had exchanged bitter words on the issue.[59]

Troubled by the charges and counter-charges that undermined the Commission's defense of the testing program, Libby proposed a joint statement acceptable to all the Commissioners. Both Strauss and Murray expressed their willingness to cooperate, but neither man ultimately could overlook the deep personal antagonism that divided them. Before they could reach any agreement at a subsequent Commission meeting, Strauss and Murray fell into bitter name calling: Murray accusing Strauss of constantly twisting words and Strauss blatantly denouncing Murray as a liar.[60] Consequently, the "Clean Bomb Statement" stood without further official elaboration.

Even had there been clarification, Strauss had already exposed the Commission to scathing criticism from the press. Ralph Lapp wrote a devastating critique in the Bulletin of the Atomic Scientists, when he observed that Strauss single-handedly had invented "humanitarian H-bombs." Lapp added a careful review of the available fallout data and a detailed analysis of the probable configuration of the hydrogen bomb. Lapp concluded that dirtiness was a relative thing. Superbombs could be designed to be relatively clean or very dirty. The former, Lapp assumed, were desirable for test purposes, while the latter could serve as a strategic weapon. "War is a dirty business," Lapp observed. "Part of the madness of our time is that adult men can use a word like humanitarian to describe an H-bomb."[61]

STASSEN TRIES AGAIN

The Administration's attempt to exploit the "clean" weapon theme had backfired, but it did show how seriously Dulles, Strauss, and others took the continuing demand for a moratorium or a permanent ban on testing nuclear weapons. Earlier in June 1956 both men had taken strong objection to British plans to open negotiations with the Soviet Union on this subject.[62] But even more threatening was the test ban proposal that Harold Stassen included in the disarmament plan which he sent to the National Security Council on July 29.[63]

Stassen based his proposals on the assumption that almost any nation, if it so desired, could fabricate an elementary nuclear weapon within three years. Thereafter, he assumed, a nuclear power could build a thermonuclear weapon within another three years. Stassen also foresaw that the United States, the United Kingdom, and the Soviet Union would each have developed intercontinental missiles capable of delivering thermonuclear warheads within three to ten years. Thus he predicted that in the relatively near future as many as twenty nations, both east and west, would possess nuclear weapons with the potential of igniting world war.[64]

To forestall uncontrolled nuclear proliferation, Stassen offered a complex ten-point plan designed to halt the spread of weapons while promoting peaceful uses. Incorporating key aspects of Eisenhower's Atoms-for-Peace and open skies initiatives, Stassen attempted to weave together the main threads of a comprehensive nuclear disarmament policy. The Commission could hardly take seriously Stassen's proposal that a test ban, a reduction of the numbers of nuclear weapons, and a cessation of all production of fissionable materials for weapons, all be accomplished by July 1, 1957. Stassen even suggested a "reasonable" nuclear posture for the United Kingdom, and eventual inclusion of the Chinese communists within the terms of an international arms control agreement.

Whatever hopes Stassen may have had for his disarmament proposal, he had jeopardized his own future by stumbling into the quicksand of Republican politics. In a private meeting with the President on July 20, just before Eisenhower was to leave for Panama to confer with Latin American leaders,

Stassen announced his intention to support Christian Herter for the vice-presidential nomination at the forthcoming Republic national convention. According to Stassen, a private poll indicated that with Nixon on the ticket Eisenhower lost six percentage points and jeopardized the party's chances of recapturing control of Congress. With Herter, Stassen believed the Republicans could attract enough independents and Democrats to achieve Congressional victory.[65]

Apparently, Eisenhower offered no comment on Stassen's startling announcement. Recovering from ileitis and anxious to take off for his delayed trip to Panama, Eisenhower merely assured Stassen that as an American citizen he was free to follow his own judgment. Stassen interpreted the President's vague response as tacit approval of the ill-fated plans to "dump" Nixon from the ticket.[66] Whatever the President's motives, or distractions that day -- he was also very much involved in the annual civil defense exercise, "Operation Alert," which simulated an attack over Alaska -- he left Stassen with the impression that the President favored a truly "open convention." Stassen's miscalculations both of the President's intentions and of Nixon's strength within the Republican Party seriously undermined his role as the President's "Secretary of Peace." In the midst of renewed crisis in the Mid-east prompted by Nasser's nationalization of the Suez Canal Company, tough budget negotiations with Defense Secretary Wilson, and planning sessions with Leonard Hall about the forthcoming convention in San Francisco, Eisenhower was pestered by the "Stassen affair," as Anne Whitman called it. On July 31 Eisenhower met with Stassen, Ambassador Amos Peaslee, Deputy Special Assistant to the President, and Strauss to discuss progress on disarmament. During the meeting, Eisenhower decided to place Stassen on a month's leave-of-absence so that the disarmament advisor could continue his political activities as a private citizen.[67]

Inevitably, Stassen's political campaigning for Herter, who actually nominated Nixon in San Francisco, hurt Stassen's standing within the President's inner circle. Meeting with Dulles after the convention, Peaslee pointedly disassociated himself from Stassen's activities. Dulles lamented the unfortunate developments and predicted that they would create a real question of confidence in future disarmament negotiations. Senator William Knowland, a member of the Joint Committee, also confided in Dulles that Congress could no longer have confidence in Stassen's continuing conduct of disarmament affairs.[68] Nevertheless, despite his pique over Stassen's actions, Eisenhower stood by his "Secretary of Peace" even as opposition to Stassen's June 29 disarmament plan mounted within the Administration.

Despite the concerted efforts of the Administration and the Commission to resolve the pressing questions that the development of nuclear technology had created in domestic and international affairs, little was accomplished during the first six months of 1956. The resolution of nuclear power policy had stalemated with defeat of the Gore-Holifield bill. The President's hopes for halting the slide into the abyss of nuclear war had been thwarted by practical considerations of national security. By pressing too hard and blundering into political troubles, Stassen had hurt the cause of nuclear disarmament and the test ban more than he had helped it. Six months of opportunity had slid by. Now as Congress disbanded for the national nominating conventions, it seemed certain that nuclear issues would find a prominent place in the presidential campaign.

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CHAPTER 13
NUCLEAR ISSUES: THE PRESIDENTIAL CAMPAIGN OF 1956

In contrast to their strategy in the 1952 presidential election, Dwight D. Eisenhower and Adlai Stevenson vigorously debated America's nuclear future in 1956. To be sure, as the Oppenheimer case, Dixon-Yates, and the Lucky Dragon incident had dramatized, atomic energy was no stranger to the political arena. Yet never before had presidential candidates stressed nuclear issues in a political campaign. In large part, the President himself was responsible for the debate. Throughout his first term Eisenhower had resolutely pressed his Administration to disseminate, within the limits of national security, all available information on atomic energy. Operation Candor, the President's 1953 United Nations speech, Atoms for Peace, the 1954 Atomic Energy Act, the Geneva peaceful uses conference, annual civil defense exercises, fallout reports, biomedical research and publication, and even the Commission's printed handbook on weapon effects were all part of his effort to inform the American public about atoms for war and peace. Eisenhower would have preferred to keep atomic energy out of partisan politics, and he was annoyed when Stevenson and others tried to capitalize on the test ban and other national security issues. The 1956 presidential campaign, however, reflected Eisenhower's belief that the American people should face up to both the hopes and fears of the nuclear age.

During the presidential campaign in 1956, political skirmishes began over domestic nuclear power, gradually spread to contention over international cooperation, and concluded in a spirited exchange over weapon testing and development. Eisenhower easily won the debates and the election, but not without paying a political price in terms of public confidence in the Atomic Energy Commission, its leadership, and programs.

STRAUSS ON THE OFFENSIVE

The slim margin of the Administration's victory on the Gore-Holifield bill did not deter Strauss for a moment in his drive to develop nuclear power. Privately he considered Senator Anderson's suspicions of his long association with the Rockefellers preposterous, but he hoped that the incident would serve as evidence of Anderson's irrational hostility towards him. Anderson was correct, however, in his conclusion that Strauss was determined to keep the development of nuclear power in the private sector as much as possible. This bias was never more evident than in Strauss' efforts to expedite construction of the Enrico Fermi nuclear plant near Detroit.

The Fermi project had grown out of one of the responses to the first invitation under the Commission's power demonstration reactor program. The proposal had come from a group of electric utilities headed by the Detroit Edison Company, whose president, Walker L. Cisler, had long been a spokesman for industry in nuclear power development. Cisler's plan had been to build a full-scale nuclear power plant in marshland on the shores of Lake Erie, thirty miles south of Detroit. The plant was based on the technology produced in operating the experimental breeder reactor, which had first produced electricity from nuclear energy at the Idaho test station in 1951. The breeder concept, which theoretically offered the greatest efficiencies in the use of uranium fuel of all proposed reactor types, also posed some of the most difficult engineering problems. The experimental plant in Idaho had provided much useful information, but it was far too small to serve as a prototype for the Fermi plant. Furthermore, operation of the Idaho plant had raised some grave questions about the safety of breeder reactors in general. In an experiment in November 1955, scientists at the Idaho station had deliberately subjected the test reactor to a

power surge, which revealed a short but definite positive temperature coefficient. This term meant that under certain conditions an increase in core temperature produced a rise in reactivity, which could lead to a power runaway and core meltdown. In fact the core of the experimental reactor had been destroyed in this test.[1]

Under the high priority which the Commission accorded the Fermi project as part of the power demonstration program, W. Kenneth Davis and his staff pushed ahead with the administrative approvals necessary to begin construction of the plant. The core meltdown at Idaho was reason for concern, but the Idaho reactor engineers believed they understood the cause and could correct it. Without disagreeing with this assessment, the Commission's advisory committee on reactor safeguards warned Kenneth E. Fields, the general manager, in June that until much more information was available about the Idaho accident there was no assurance that a similar reaction could not occur in the Fermi plant. Estimates indicated that an equivalent reactivity surge in the Fermi plant could conceivably result in an explosion that would breach the containment building, and no one knew whether the Idaho failure represented the the most serious accident theoretically possible. Before the Fermi reactor could be built with solid assurance of safe operation, the advisory committee concluded that the Commission would have to undertake extensive research, not only on the meltdown mechanism, but also on fast breeder reactors in general.[2]

This conclusion shocked Strauss and the Commission. Delay of the Fermi project pending additional research might seriously undercut the power demonstration program and give the Joint Committee new ammunition for a large federal reactor program. The same result could come from a Commission decision to put more money into breeder research and development. On the other hand, the Commission could not reasonably ignore the advisory committee's report and grant Cisler's group a construction permit. Under the circumstances the Commission could do no more than issue a conditional permit, pending the completion of additional research needed to assure safe operation of the reactor.

Before the Commission could make a formal decision, Commissioner Murray revealed the conclusions of the advisory committee's report in a hearing before a House appropriations subcommittee on June 29. Outraged that the Commission had withheld the report and then released it to a House subcommittee rather than the Joint Committee, Senator Anderson demanded a copy of the full report. Fearing that release of the report before the Commissioners had made a formal decision on the case would set a dangerous precedent for the Commission's regulatory process, Strauss consulted the staff in an effort to find a way around the Joint Committee's request. After several long discussions, the Commissioners agreed to send the Joint Committee a copy with a request that it be considered "administratively confidential." Anderson refused to accept the report with this condition and informed G. Mennen Williams, the Governor of Michigan, about the situation. When the Commission again balked at release of the report, Anderson charged that the Commission had used "star chamber" proceedings and suggested that the new Congress in 1957 consider legislation that would separate the Commission's licensing and regulatory functions from its research and production responsibilities.[3]

Teller had already warned Strauss that the Fermi reactor should not be built until the instability in the Idaho plant had been explained. Strauss also admitted privately that denial of the advisory committee report had been an error, but he had no intention of delaying the Fermi project. The Commission did not reconsider its decision to grant a conditional construction permit and on August 8 Strauss participated with Cisler in ground-breaking ceremonies near Detroit. Strauss acknowledged that the Commission's action had precipitated

"some rather violently voiced opposition in Washington," but he wrote this off simply as an "attack being directed against the free enterprise development of nuclear power in this country."[4]

Privately Strauss gave some thought to the stance the Administration should take on nuclear power in the impending presidential campaign. At his farm in Virginia he drafted for possible use by Republican members of the Joint Committee a statement denouncing Anderson for destroying the "committee's bipartisan tradition." This, he admitted to a White House aide, was a "labor of love," but on second thought he decided that it would do little more than anger Anderson. The White House agreed. As a campaign strategy Strauss apparently accepted the advice of one of his own staff that "a direct debate on the issue of public versus private power should be avoided, except to point out that the Commission is not doing business . . . exclusively with privately owned utilities."[5] Since Anderson and the Democrats had already abandoned the nuclear power issue, neither Eisenhower nor Stevenson made any extensive use of it during the campaign.

POLITICS OF THE INTERNATIONAL ATOM

In the spring and summer of 1956, Atoms For Peace weathered international as well as domestic politics. The Atomic Energy Commission had assumed that in order to foster European political and economic integration, the United States would have to negotiate with the Community of Six on a most-favored-nation basis. That is, while promoting EURATOM partnership among the Six, it would be inconsistent for the United States to execute bilateral cooperation agreements with prospective members of the European Community on terms more favorable than it was willing to give EURATOM itself. For its part, the State Department was well aware of the potential embarrassment and inconsistency inherent in pursuing bilateral arrangements with individual members of the Coal and Steel Community, while at the same time trying to promote a common atomic energy institution among the Six. Bilateral negotiations with the European countries could have been discontinued, but at a price which might have damaged the United States' relations with EURATOM. Belgium's foreign minister, Paul-Henri Spaak, warned that EURATOM's opponents, especially in Germany, were encouraged by America's apparent willingness to undermine European unity by continuing to make bilateral arrangements with European countries. Spaak went so far as to predict "doom" for EURATOM should the United States indicate any willingness to conclude with Germany a power bilateral arrangement under which enriched uranium would be supplied from the President's February 22 allocation. The dilemma was not easy to resolve, particularly in view of the Commission's eagerness to pursue the bilateral route.[6]

Dulles decided it was inappropriate for the United States to refuse to negotiate bilateral agreements with the Six or to declare a moratorium on such negotiations pending the outcome of the EURATOM discussions. But he hoped to deemphasize the bilaterals by not concluding any long-term fuel commitments with the Six (Belgium being a possible exception) until after the future of EURATOM had been decided. Nevertheless, when the EURATOM negotiations bogged down in the summer of 1956, French, Italian, and German interest in discussing separate bilateral agreements with the United States increased to the point where American diplomats feared EURATOM itself was in jeopardy. To the State Department's alarm, at a particularly critical point of the EURATOM discussions between Spaak, Prime Minister Guy Mollet of France, and Chancellor Konrad Adenauer of West Germany, the Commission complicated matters by energetically promoting the bilateral agreements, which only encouraged German and French dissidents.[7]

THE BRUSSELS CONFERENCE

Without seeming to meddle in the internal affairs of Europe, there was little the United States could do overtly to encourage the participants in the Brussels Conference, which had convened on June 26, 1956, to study both the Common Market and EURATOM projects. Jean Monnet, a French statesman and former chairman of the European Coal and Steel Community, had warned Strauss that the United States should not appear to pressure the Europeans into EURATOM with generous offers of enriched uranium. Since EURATOM's formation was primarily a matter for Europeans to decide by themselves, Monnet advised, the United States would do best not to indicate its position in the matter. The trouble with such reticence, however, was that EURATOM opponents had taken encouragement from American silence. German industrialists who opposed EURATOM ownership and monopoly over fissionable materials had allied themselves with Franz Josef Strauss against Adenauer. The object of the group led by Minister Strauss was the creation of an independent German atomic energy program, subject only to loose control by the German Federal Republic, with its international component resting on bilateral relations. The French were also divided between internationalists, led by Monnet, who wanted to check German industrial resurgence through European integration, and those who did not want to sacrifice French advantages in atomic energy to European economic integration. American observers of the debates in the French National Assembly during July 1956 were surprised by the recurring expressions of resentment towards the United States from both the right and the left. Sometimes oblique, but often quite blunt, criticism of the United States was voiced even by moderates favoring EURATOM who argued that European integration provided France the best opportunity of attaining leadership in the development of atomic energy without undignified dependence upon American help.[8]

As enthusiasm for EURATOM diminished as a consequence of the attacks from both the German industrialists and French opponents, compromises inevitably weakened the original concept. Despite repeated diplomatic hints that the United States would like to sit down with the prospective EURATOM partners to discuss a strong agreement for cooperation, the Americans were consistently rebuffed by the Six on the assumption that any direct involvement of the United States in the negotiations would be highly damaging. At the same time, discussions at Brussels produced compromises which threatened to produce a weak and inconsequential European institution, incapable of advancing the United States' main political objective -- tying Germany to Western Europe through economic integration. EURATOM supporters were not challenged by a direct assault, but rather were undermined by proposals which emphasized cooperation rather than integration. This tactic would have left participating members free to pursue their own course. Left unresolved was the question of whether there could be private ownership of nuclear materials within the community and how the Common Market would be tied to the EURATOM treaty.[9]

THE FRANCO-ITALIAN INITIATIVE

With EURATOM in the doldrums, the French and Italians independently approached the United States to request far-reaching classified bilateral agreements for cooperation -- the French proposing an agreement involving 1,000 kilograms of enriched uranium, the Italians an agreement covering 2,500 kilograms. The Franco-Italian maneuver was audacious, and when Dulles learned that the Commission had actually welcomed the overture, he severely rebuked Strauss. Invoking Eisenhower's directive of January 11 and noting Ambassador James B. Conant's fear of the disruptive effects of persistent United States bilateral negotiations, Dulles stated unequivocably: "I believe it is incumbent

on us to see that we do not take actions which might make more difficult the negotiating problems of the Six Nations." Pending the outcome of the EURATOM talks, Dulles curtly informed Strauss that the United States would suspend bilateral talks.[10]

Strauss, angered and no doubt hurt by Dulles' injunction, wanted to take the matter directly to Eisenhower, but instead confined his reaction to Herbert Hoover, Jr., the Under secretary of state. Not only did he believe the Administration was backing the wrong program in EURATOM, but he also thought that United States' inconsistencies had become a major impediment to the Atoms-for-Peace program. Strauss observed that the United States had already negotiated three bilateral agreements covering power reactors with members of the Community of Six, namely, France, The Netherlands, and Belgium. Nevertheless, the Atomic Energy Commission was not authorized by the State Department to discuss power agreements with Italy or Germany, despite their desire to launch atomic energy programs. Meanwhile, the Commission was authorized to negotiate power bilaterals with Sweden, Norway, and Spain. Thus, as Strauss noted with some bitterness, the Commission's role was difficult and confused. It could negotiate rather freely with states in Western Europe outside the Community of Six; but the Commission was enjoined from immediate discussions with Germany and Italy, while at the same time the Commission was collaborating with all other members except Luxembourg. While Strauss professed support for the Administration's larger intentions embodied in EURATOM, he did not believe a discriminatory policy would advance Atoms for Peace in Western Europe.[11]

THE SHADOW OF CALDER HALL

After Congress deserted Washington for the campaign hustings in August 1956, Strauss had an opportunity to reassess his position in his continuing contest with the Joint Committee over domestic nuclear power. The defeat of the Gore-Holifield bill gave him breathing space; at the very least it referred the whole question to the new Congress, which a big Eisenhower victory might well make Republican. But no one understood better than Strauss that the ultimate defeat of a government-financed power reactor program might well depend upon whether the accomplishments of private industry made federal support unnecessary.

In the autumn of 1956 it was by no means clear that a federal program could be avoided. On October 17, Queen Elizabeth II threw the switch sending electricity from the Calder Hall reactors into the national power grid. Anticipating the British achievement, Strauss and the Administration had tried to play down Calder Hall as essentially a plutonium-production facility (which it was), which generated power only as a by-product. But Calder Hall had an enormous impact on the fledgling nuclear industry in many countries, including the United States. Sir Christopher Hinton, director of the British project, announced flatly that "the Calder Hall reactor is giving us the initial lead in the use of nuclear power and we shall be able to retain that advantage for at least a decade by improvements in this type of reactor."[12] American industrial leaders were not quick to argue the point, and Strauss could reasonably expect that the British accomplishment would at the very least rekindle a new demand for federal construction of large dual-purpose reactors in the United States when the new Congress reconvened in January.

To make the British achievement even more impressive, the American entry in the international competition was more than a year from completion. Despite strong pressure from Strauss and the Administration, the Shippingport reactor could never have challenged Calder Hall's completion date. Rickover and his

team had already applied extraordinary measures in their efforts to accelerate design and construction, but even in the fall of 1956 it was already apparent that Rickover would not meet his original target for completion in February 1957. There was only so much that more exhortation and money could do to reverse the effects of labor disputes and delayed deliveries of materials.[13]

NUCLEAR POWER AT HOME AND ABROAD

Strauss still had high hopes for the power demonstration reactors, but there was cause for worry here too. The question which Senator Anderson and others had raised about the safety of the proposed Fermi plant had sent a ripple of concern through the Detroit area. In September the United Automobile Workers, the American Federation of Labor, and the Congress of Industrial Organizations filed petitions for intervention and requests for public hearings on the Fermi license application. The experience which Westinghouse had gained on the Shippingport project made it possible for the company to move ahead on the design of the Yankee Atomic plant, but major decisions still remained before construction could start on the power plant at Rowe, Massachusetts. The third project in the first round, the Consumers project in Nebraska, was still struggling to be born. Almost two years after the Commission had authorized contract negotiations, the staff still had not arrived at a funding arrangement that was acceptable to both the public power district and North American Aviation, the design and development contractor. None of the proposals in the second round had yet been approved, and there was growing doubt within the staff that all of them could ever be accepted.[14]

Both Murray and Libby gained some measure of Strauss' determination to keep nuclear power development in the private sector when Commissioner Harold S. Vance raised the issue in a meeting in September 1956. It was perhaps surprising to Strauss that his long-time business acquaintance, a conservative midwestern Republican and industrial leader, should propose that the Commission construct at least two full-scale nuclear power plants to assure that the most promising reactor types were quickly developed. A self-educated engineer who had made his way to the top of the automobile industry to become president of the Studebaker Corporation, Vance had served with Strauss on several corporate boards of directors, and the two men had known each other on a first-name basis since World War II. Strauss had secured Vance's appointment to the Commission just a year earlier to fill Joseph Campbell's vacancy.[15] Vance not only had credentials acceptable to Strauss and the Administration, but he also seemed to possess personality traits likely to assure that he would not challenge Strauss' leadership. At age sixty-six Vance gave the impression of being a phlegmatic, soft-spoken, and rather colorless business executive.

Vance, however, soon proved himself capable of independent action. On September 13 he told his fellow Commissioners that they could not rely solely on industry to develop nuclear power, especially if the United States expected to win the international race with the United Kingdom and the Soviet Union. Vance believed government projects were necessary to develop some of the more promising and more difficult concepts, such as fluid-fuel reactors. Strauss immediately voiced his concern that, once the Commission opened the door, there would be no way to close it. Industry would thereafter expect the Commission to fund all development costs. Vance did not contradict Strauss directly but rather argued that winning the international race was more important than keeping the government out of nuclear power. This opinion delighted Murray, who at last saw the prospect of gaining support for his views within the Commission. Even Libby confessed some interest in Vance's arguments, particularly if the government were to fund development of pressurized-water reactors, the most

promising type. For the first time since Strauss had become chairman, he rather than Murray faced the possibility of being a lonely minority of one on a major policy issue. Neither Vance nor Libby, however, was yet ready to break ranks with Strauss. The Commissioners agreed only to separate the domestic and international aspects of reactor policy and consider both at a later date.[16]

Given the delicate balance within the Commission, Strauss laid his plans carefully. As a short-term measure, he spurred the staff to expedite proposals under the power demonstration program. Before the end of September the Commission approved contract terms for two public power projects, Consumers in Nebraska and Piqua in Ohio.[17] This action blunted the charge by the rural cooperatives that the Commission was favoring big private utilities. On the policy issues, however, Strauss would not move until the November elections gave him a reliable forecast of the political future.

THE POLITICS OF ATOMS FOR PEACE

During the summer the Democrats geared up for the fall campaign. The Democratic platform, published on August 16, gave full credit to Roosevelt and Truman for initiating the "atomic era," but condemned the Eisenhower Administration for plunging "the previously independent and nonpartisan Atomic Energy Commission into partisan politics." To recapture America's lead in "the world race for nuclear power, international prestige and world markets," the Democrats pledged not only to accelerate the domestic civilian atomic power program, but also "to give reality -- life and meaning -- to the atoms for peace program. We will substitute deeds for words."[18] Neither C. D. Jackson nor Gerard Smith could have quibbled with this plank.

As vice-presidential candidate, Kefauver kept up his hard-hitting attack on the Atoms-for-Peace program. Describing Strauss as that "baleful figure who is [Eisenhower's] chief atomic energy advisor," Kefauver repeatedly asserted that the President and the chairman of the Commission wanted to keep America's atomic power production in private hands despite the fact that both the British and the Russians had forged ahead of the United States.[19] Consistent with the Democratic platform, Kefauver found no fault with the Atoms-for-Peace program except that the Administration had been too slow, too cautious, and too friendly towards big business.

Strauss accepted the major role in countering Kefauver's charges. On the same October day that the senator was railing against Strauss in New Hampshire, the chairman defended the Atoms-for-Peace program before the New York Board of Trade. Strauss reiterated the accomplishments of the Geneva conference on peaceful uses and the provisions of the bilateral agreements for cooperation, but he highlighted the progress made towards establishing an international atomic energy agency. Predictably, he rejected the sharp dichotomy between public and private power which Kefauver had drawn. In Republican terms, the Eisenhower Administration had stripped "the iron jacket of Government monopoly . . . from the atom," returning atomic energy to the people.[20]

Both the florid rhetoric of the public/private power debate and partisan criticism that the Atoms-for-Peace program lagged behind foreign competitors to a large extent missed the point. All along the President's program had three clearly stated aims: to allocate fissionable materials to peaceful uses in medicine, agriculture, and research; to promote the production of power using atomic fuel; and to divert uranium stockpiles from the nuclear arms race. Under the stewardship of the Commission and the Department of State, the first two goals were successfully, if undramatically, advanced through bilateral agreements by the summer of 1956. The third objective, closely related to nuclear disarmament, required a significantly different negotiating strategy.

Although Atoms for Peace was not a disarmament proposal, to achieve cooperation with the Soviet Union in establishing nuclear safeguards through an international agency, the United States had to sacrifice both speedy and efficient negotiations. Bernhard G. Bechhoefer, one of the State Department officers involved in planning Atoms for Peace, later observed that the most successful East-West negotiations following World War II involved patient and confidential discussions with the Russians. Unfortunately, this strategy also subjected the Eisenhower Administration to charges of being too secret and too slow after 1955 when the Soviet Union joined the discussions relative to the International Atomic Energy Agency.[21]

DISARMAMENT AND THE TEST BAN: INTERNAL DEBATE

While the Democrats ineffectually probed domestic nuclear issues, sharp differences developed within the Eisenhower Administration over Stassen's nuclear disarmament proposals. Predictably, the Commission had responded warily to Stassen's June 29 disarmament plan. Asserting that it did not object to Stassen's intentions, but only to his methods, the Commission offered the National Security Council a detailed critique of the disarmament plan as it affected nuclear weapons. To begin with, the Commission did not concur in Stassen's estimates concerning nuclear proliferation. Stassen was driven by the belief that as many as twenty nations might soon be armed with nuclear weapons. In dismissing this estimate as "speculative" the Commission tried to undermine Stassen's main premise.

The Commission objected to any proposal that limited testing and reduced the nuclear weapon stockpile without providing ironclad procedures for inspection and verification. There was unanimous opposition to setting July 1, 1957, as the deadline for halting the production of weapon-grade fissionable material. Not only was inspection an issue, the date was also too early for the United States to reap full advantage of the weapon improvements tested at Teapot and Redwing. Even Murray concurred.[22]

The Commission was somewhat more conciliatory on testing. With the exception of Murray, the Commission continued to favor a test ban only as part of a general disarmament agreement which included "an effective and proven inspection system." Nevertheless, the Commission also recognized that there were overriding political considerations which made it advisable for the United States government to propose negotiations towards an agreement for limitations on testing. The Commission's concession was stunning, even if Murray's continued advocacy of a unilateral test ban distracted somewhat from the significance of the moment. Still determined to continue the testing program, the Commission was at least willing to discuss limiting the size, number, frequency, and location of weapon tests.[23]

Of all the groups that wanted to ban testing, Libby believed by far the most numerous worldwide were those who were afraid of fallout. "They are just plain scared," Libby observed. Admitting that he did not like the thought of his children collecting strontium 90 in their bones despite his belief that it was essentially harmless, Libby suggested a strategy to limit worldwide fallout from testing. His idea was simple, and probably unenforceable: to limit worldwide fallout to 10 megatons of test detonations, divided more or less equally among the testing nations. The idea was impractical, but it did reflect the Commission's awareness that something more than rhetoric was required to quiet public fears over fallout.[24]

Just when the Commission was willing to consider concessions on testing, the Soviet Union unexpectedly launched a major test series. In the past the Commission had not called attention to Russian activities, but after the Soviet

Union began testing on August 24 Strauss pointedly contrasted Russian secrecy with the comparative openness of test announcements by the United States. On August 31, Eisenhower noted the second Soviet shot, and on September 3 the Commission reported still a third.[25] Finally, on September 10, the Russians announced their own fourth test.

Surprisingly, the Soviet's test series did not scuttle the Commission's search for an acceptable formula by which to limit testing. On September 5, the same day that Adlai Stevenson renewed his call for a test ban in a speech to the American Legion, the Commission organized an ad hoc committee chaired by General Alfred D. Starbird, director of military application, to study what might constitute an acceptable limitation on testing. Starbird's committee, which believed the Soviet Union was closing the gap in delivery capability, preferred no test limitation. Besides the inspection problem, the committee predicted that a test ban would have severe impact on morale and recruiting at the national laboratories. Through rigid controls over its scientists, the Soviet Union could maintain its testing capability despite drastic restrictions. Americans, on the other hand, could not expect to retain the best scientists and technicians without an active program. Starbird's group also feared that the Russians might stockpile improved nuclear weapons to be tested on the eve of a general war, too late for the United States to take counter measures.[26]

Caution and skepticism aside, Starbird's committee weighed the pros and cons of several alternatives for limiting testing. All involved risk to American security in the committee's view, but the least risky was to "limit" testing to 1955-1956 levels. Should more stringent limitations be necessary, the committee recommended the adoption of some variation of Libby's plan, perhaps limiting total yield in any two-year period to thirty megatons of atmospheric testing. Such an agreement would still require some verification, and no doubt would be only a step towards a more comprehensive test ban.[27]

Determined to find a workable disarmament formula, the President confined his discussions to Dulles, Wilson, Strauss, Radford, Stassen, and his own staff, Sherman Adams, William H. Jackson, and Amos J. Peaslee. With the possible exception of Stassen, Dulles most closely shared Eisenhower's sense of a moral imperative. As cautious as Strauss, Dulles nonetheless viewed the nuclear arms race as an "overwhelming moral issue" which required the United States to give "highest regard to world opinion." Although Dulles did not favor a total test ban, he was convinced that the United States should "seek agreement on tangible forward steps toward as much as is possible to obtain." In contrast to the Commission, he did not want to defer negotiated agreements "merely for lack of an all-embracing perfect plan."[28]

Eisenhower's small inner circle of disarmament advisors, and not the National Security Council, evaluated Stassen's proposals on September 11, 1956. Both Strauss and Radford now believed that Dulles was leaning towards Stassen's position. With Eisenhower present, Strauss wasted no time in arguing that a reliable inspection system could not be devised by July 1, 1957. Radford went even further, doubting whether an acceptable inspection system could ever be achieved. Against this pessimism, Dulles and Stassen reminded the President that the purpose of the meeting was to discuss whether the Administration should initiate quiet exploratory consultations, beginning with the British, to determine if Stassen's plan might serve as the basis for negotiations.

The problem was that Strauss and Radford could not accept major portions of the proposal. Strauss stressed that the United States should continue to stockpile fissionable material at least through 1958. Production capacity had just reached the point where significant numbers of defensive weapons were being added to the stockpile. Radford concurred, observing that the United States

would have to revise its war plans if nuclear stockpiling were halted in the next two years.[29]

As so often happened, Radford's hardline remarks provoked an impatient response from Eisenhower. If moral arguments were not persuasive, the President was prepared to use economic ones. Citing Secretary of the Treasury Humphrey, Eisenhower argued that some alternative had to be found to the arms race if only to preserve the American economy. From the President's perspective, mounting military expenditures, coupled with the threat of worldwide proliferation of nuclear weapons, represented threats to American security as significant as those from Russia itself.

When the discussion focused on testing, Strauss doubted that the United States could ever stop completely. Even if the United States did not want to develop more powerful or more sophisticated weapons, the Commission would have to guard against deterioration in stockpiled devices, improve control of fallout, and develop related technologies such as safety. When Strauss again objected that July 1, 1957 was an unrealistic deadline, Dulles proposed that December 31, 1957, "or as soon thereafter as an effective inspection system had been installed," would be just as acceptable. Dulles was trying to find some ground for realistic exploratory talks with American allies first, followed by negotiations with the Russians and Chinese.

Although the meeting broke up inconclusively, Eisenhower forcefully restated his determination to find a way out of the disarmament impasse. His hope was to end or limit nuclear tests and to restrict the production of fissionable material to peaceful purposes. Those measures would calm escalating worldwide fears over fallout and nuclear war, but they could not be accomplished without effective inspection and assurances against surprise attack, both of which were also essential for a durable peace. He advised Radford to continue military planning on the assumption that no agreement would be reached. Eisenhower, however, also endorsed Stassen's proposal in principle, directing that the United States assume "affirmative leadership" towards an agreement. Recalling the seeming hopelessness of an agreement on reunification of Austria, the President still thought that persistence with the Soviet Union might pay off. Before adjournment, he requested that the Departments of State and Defense, the Atomic Energy Commission, and the Joint Chiefs prepare a joint paper, with dissenting views if necessary, for Presidental approval by October 15, 1956.[30]

Eisenhower's hope for Soviet cooperation received a set back on the very day of the White House disarmament meeting. On September 11, Premier Bulganin rejected the idea of controlling the production of fissionable materials without at the same time outlawing the use of nuclear weapons. The one, Bulganin claimed, was useless without the other. Conversely, Bulganin argued against linking a test ban with a general disarmament agreement as Strauss insisted. In language not unlike that used by Dulles and Stassen, Bulganin described the termination of testing as the "first important step" toward eventual abolition of nuclear arms.[31]

While the President's disarmament advisors labored to meet the October 15 deadline, few outside Eisenhower's inner circle realized the depth of his commitment to end the arms race. Eisenhower believed the matter was too urgent, and delicate, for political bickering. As his sharp tone with Strauss and Radford had indicated, he lost all patience with attempts to exploit the issue for partisan advantage.

THE STEVENSON CHALLENGE

On September 5, running on a Democratic platform which accused the Republicans of plunging "the previously independent and non-partisan Atomic Energy Commission into partisan politics," Stevenson thrust the test ban issue into the presidental campaign during a foreign policy speech to the American Legion. Attempting to capture something of the peace issue for the Democrats, Stevenson told the Legionaires that he favored an end to the draft as well as an end to testing megaton hydrogen bombs.[32]

Although Eisenhower's contempt was veiled, he did not hesitate to respond vigorously to his own political advantage. In what he called his first major address of the 1956 campaign, Eisenhower flatly rejected the possibility of ending the draft under current world conditions. Nor would he endorse any "theatrical national gesture" to end testing without reliable inspection. "We cannot salute the future with bold words," the President warned, "while we surrender it with feeble deeds."[33] Eisenhower's speech, however, was largely focused on other matters, and revealed that disarmament and test ban had not yet become major campaign issues.

When Stevenson responded to Eisenhower on September 21 in Silver Spring, Maryland, he elevated the rhetoric only slightly. Like the President, the Democratic candidate also addressed the broad issues of the campaign. Nevertheless, Stevenson gave highest priority to defense questions, including "the incalculable effects of unlimited hydrogen bomb testing." If he were guilty of grandstanding, Stevenson observed, then he was in the good company of Pope Pius XII, Sir Anthony Eden, representatives of the Baptist, Unitarian, Quaker, and Methodist churches, and Commissioner Murray among other sincere and thoughtful people. On the same day Murray issued his own press release denying that he had any partisan motives in raising the question of testing policy; he called for the end of multi-megaton weapon testing and greater effort on smaller weapons.[34]

THE PRESIDENT STANDS FIRM

To Eisenhower's distress, neither Stevenson nor Murray would abandon the test ban question. In Minneapolis on September 29 and in New Jersey a few days later, Stevenson reiterated his proposals and challenged Eisenhower to debate the issues. Murray, in classified correspondence, once again goaded Eisenhower about limiting tests below one hundred kilotons. The President icily referred the letter to the National Security Council without a hint to Murray that Strauss was working on just such a proposal. Eisenhower was willing to allow Vice-President Nixon to counter Stevenson's offensive to a point, but ultimately the President was drawn into the public debate.[35]

Following his curt reply to Murray, Eisenhower issued a public statement on thermonuclear testing. He expressed regret that the issue had been raised in a matter that could only lead to confusion at home and misunderstanding abroad. Only his closest advisors could fully understand the context of the President's remarks. Ambiguously, he noted that while testing was, and continued to be, an indispensable part of the defense program, the United States had "consistently affirmed and reaffirmed its readiness -- indeed its strong will -- to restrict and control both the testing and the use of nuclear weapons under specific and supervised international disarmament agreement."[36] Only the most astute observer would have detected in the President's words the major shift in administration disarmament policy.

Stevenson was still unaware that the Administration was preparing a major diplomatic initiative to limit testing. Eisenhower continued his broad defense of the Administration's record, including, but not featuring, comments on his

defense record. Even former President Truman, who took great delight in lambasting Nixon, would not join Stevenson in criticizing nuclear tests. Hubert Humphrey, speaking in his role as chairman of the Senate Foreign Relations Subcommittee on Disarmament, urged that the United States "give careful consideration to seeking agreement on banning tests of large nuclear weapons." Humphrey's cautious announcement, however, scarcely helped the Democrats' cause. Stevenson's frustration mounted even as Eisenhower's advisors hammered out the new disarmament proposals. In Seattle on October 9, Stevenson brought the nuclear issue front and center by accusing the Republicans, including the President, of willful political distortion. Taking to heart the fact that Ralph Lapp had endorsed his position, Stevenson boldly attacked Eisenhower's entire nuclear policy and record, even Atoms for Peace. Reminiscent of earlier Democratic criticism, Stevenson tried to contrast the government's weapon program with the Commission's failure to build a single power reactor.[37]

On October 11, senior representatives from the Commission, State Department, and Defense Department worked towards a compromise on a new disarmament policy. The Commission continued to have reservations about the effectiveness of any inspection system acceptable to the Russians, but on testing expressed its willingness to move "progressively" to limit nuclear and thermonuclear tests. As yet, the Commission had conceded little while endorsing in principle the idea of limiting testing, no doubt in the belief that any specific agreement would take years to achieve.[38]

Somehow the press caught wind of the fact that the Administration was entertaining new disarmament proposals. On the same day that his senior advisors were conferring, a reporter asked the President to confirm rumors that the Administration was considering elimination of the draft and halting thermonuclear tests. Eisenhower remarked that the journalist was telling him things about the Administration of which he had never heard. "I am quite sure no one has . . . suggested to me that we eliminate the draft in my Administration," he continued evasively. Then without even mentioning nuclear testing he declared, "Now, I tell you frankly I have said my last words on these subjects." The President had successfully sidestepped the issue, knowing full well that within four days he expected to receive a coordinated report on the implementation of the Stassen proposals. As a result, Stevenson continued to campaign blindly on the disarmament issue. In San Diego, he blasted Eisenhower for his failure in leadership and lack of new ideas. There could be no "last word" on the hydrogen bomb, Stevenson rebutted, until mankind had been freed from the menace of nuclear incineration.[39]

GROWING SUPPORT FOR STEVENSON

To be sure, Stevenson did receive some support. Former Secretary of the Air Force Thomas K. Finletter, now chairman of Stevenson's New York state campaign, denied that Stevenson really wanted a unilateral test ban. Finletter, once so critical of Oppenheimer, claimed not to be alarmed by Stevenson's rhetoric, but rather did not see how anyone could object to the Democrat's research for arms control and disarmament. In addition, numerous scientists now began to speak out in Stevenson's behalf. In the Bulletin of the Atomic Scientists, Bentley Glass, a Johns Hopkins biology professor and member of the National Academy of Sciences' fallout committee, lent credence to Stevenson's fears by warning that carelessness with ionizing radiation could well lead to genetic bankruptcy from which "there might be no recovery, for nation or for mankind." From the California Institute of Technology ten scientists, led by physics professors Thomas Lauritzen and Matthew Sands, called for a "free and open discussion" of Stevenson's proposals. "Time is running out," the

California scientists declared, "with an implacability that we ignore at our peril." Nevertheless, a street-corner poll by the New York Herald Tribune revealed that voters welcomed the lively discussion, but generally sided with President Eisenhower in the debate.[40]

Encouraged by the public response to his speeches, and anxious to score a major breakthrough in the campaign, Stevenson decided to devote a televised address exclusively to the issues of disarmament, nuclear testing, and presidential leadership. He recruited Clinton Anderson and Stuart Symington to appear with him on the program despite the fact that both Senators wanted him to tone down his remarks. Speaking from Chicago on October 15, ironically on the day Eisenhower had set for his disarmament advisors to report, Stevenson denied that his proposals for a thermonuclear test ban had been politically motivated. Still, he thought the issue appropriate for debate during a democratic election. He noted the power of a 20-megaton bomb -- as "if every man, woman, and child on earth were each carrying a 16 pound bundle of dynamite -- enough to blow him to smithereens, and then some. . . ." He described the danger of fallout from strontium 90 -- "the most dreadful poison in the world." A mere tablespoonful shared by everyone in the world would produce dangerously high levels of radioactivity in bones, perhaps causing cancer or threatening reproduction. Stevenson added quickly that he did not want "to be an alarmist," or to claim that radioactive levels were too high. He wanted to stop the tests, however, before a maniac like Hitler or other irresponsible regimes fouled the atmosphere with tests of their own. Citing Stassen on the risks of nuclear proliferation, Stevenson then criticized Nixon, his favorite campaign target, for exaggerating the difficulty of establishing safeguards. According to Stevenson, scientists and even the President himself had already acknowledged that the United States could "detect any large explosion anywhere." Ultimately, he scolded Eisenhower for wanting to shove the hydrogen bomb under the table.[41]

With the election less than three weeks away, Stevenson had succeeded in making disarmament and nuclear testing major campaign issues. Unfortunately for the Democratic candidate, the advantage was mostly with President Eisenhower. Stevenson's running mate, Estes Kefauver, almost burlesqued the issue a few days later when he predicted that H-bomb explosions might blow the earth off its axis by sixteen degrees, drastically affecting the seasons. This bit of silliness was immediately refuted by Ralph Lapp, who pointed out that the earth's weight was so great that even millions of tons of exploding TNT would have little effect on the earth's rotation or attitude. Other unnamed scientists interviewed by the New York Times called Kefauver's claims "incredible."[42]

Kefauver's irresponsible claims aside, Stevenson's proposals on H-bomb testing sparked sharp debate within the scientific community, emphasizing again how tightly the bomb had fused science and politics. Stevenson had enlisted Harold Brown, a geochemist from Cal Tech, to be his campaign advisor on test ban and disarmament. Arrangements were also quickly made to obtain scientific advice for Kefauver by recruiting David L. Hill, a Los Alamos atomic scientist and former chairman of the Federation of American Scientists, to serve on Kefauver's staff. Henry Smyth, the Commission's lone dissenter in the Oppenheimer case and now a professor of physics at Princeton, also supported Stevenson's call for a test ban. Across the nation scientists signed petitions and letters calling for a test ban or public debate of the issue. As reported in the press, the number of scientists supporting Stevenson grew steadily. In addition to the ten scientists from Cal Tech, five nuclear scientists from Argonne National Laboratory endorsed Stevenson's efforts. In New York, eleven physics professors at Columbia University, where Eisenhower had once been president, took Stevenson's side on the H-bomb issue. Twenty-four scientists at

Washington University in St. Louis, thirty-seven faculty members from City College of New York, and sixty-two nuclear scientists from Brookhaven National Laboratory variously subscribed to Stevenson's position.[43]

THE ADMINISTRATION'S STANCE

The Eisenhower Administration could also enlist prominent scientists to support its position while it continued to assess the effects of nuclear explosions. Early in October, while Stevenson was preparing his test ban proposals, the Commission again reviewed estimates of the consequences of nuclear warfare. Spurred by General Gavin's testimony in the spring, preliminary studies by the division of biology and medicine confirmed that strontium 90 presented the greatest fallout hazard after a nuclear attack. In the short run, perhaps 50 percent of the crops might be contaminated and 35 to 60 percent of the unsheltered animals might be killed within the fallout area, with highest mortality closest to ground zero. Necessarily the estimates were vague and depended upon numerous factors, including bomb yield and weather conditions. The classified studies generally confirmed the National Academy of Science's projection concerning genetic mutations. Research conducted in cooperation with the United States Weather Bureau could not rule out the possibility that a massive nuclear exchange might usher in a new "ice age" should vast amounts of dust thrown into the stratosphere reduce the amount of solar radiation reaching the earth. Long-term effects, however, were considered negligible when compared with the immediate holocaust which would be unleashed in all-out nuclear war. The Commission's estimates, however, were limited by the fact that it did not have access to war plans and intelligence reports on prospective targets. Consequently, General Starbird recommended that the issue be referred to an interdepartmental group to be convened by the National Security Council.[44]

Despite the uncertainties of nuclear war, the Commission remained confident that nuclear testing was safe. On October 12, Willard Libby addressed the American Association for the Advancement of Science on "Current Research Findings on Radioactive Fallout." Libby also noted that strontium 90 was the most hazardous of the many radioactive elements found in fallout. But he did not believe that the total amount of radioactive debris in the stratosphere, estimated at 24 megatons of fission products, had increased since 1955. The Redwing tests, conducted from May into July, had successfully held thermonuclear fallout to a minimum, he reported.[45]

Building on Libby's report, Shields Warren, former director of the Commission's division of biology and medicine, lashed out at Stevenson's campaign. Warren, a prominent authority on medical radiology and scientific director of the Cancer Research Institute of the New England Deaconess Hospital in Boston, telegraphed Strauss that Stevenson's remarks on the dangers of testing needed correcting. Citing Libby's data, Warren asserted that testing could be continued for thirty years at the current rate without creating a significant genetic hazard or raising background levels more than a fraction. On the other hand, he argued, "to permit us to fall behind the Russians is disastrous. To wait for them to catch up to us is stupid."[46]

Strauss and Robert Cutler, the President's national security advisor, assumed the lead in preparing the Administration's counter-attack. Strauss urged the general advisory committee to help disabuse the public of Stevenson's inaccurate campaign statements about the "biological effects of radiation, fall-out hazards from test activities, [and the] relative degree of progress in atomic power in Russia, England and the U.S." Without dissent from the committee, Robert E. Wilson suggested that his fellow members use their speaking

engagements to present the correct technical information to the public. Warren C. Johnson, newly elected chairman of the committee, asked Strauss to provide a working list of erroneous and misleading statements. For his part, Cutler arranged for twelve distinguished scientists to meet the President and then to express their indignation over the unwarranted political exploitation of scientific issues.[47]

Ultimately, Eisenhower decided that only he could effectively counter Stevenson's campaign against testing. Perhaps recalling the usefulness of the thermonuclear chronologies which had been prepared by the Joint Committee and the Commission during the Oppenheimer crisis, Eisenhower on October 17 asked Strauss, Wilson, and Dulles to draft a "complete history" of the hydrogen bomb, with limits set by security regulations. The history was intended to set the record straight regarding the Administration's commitment both to peace and security. James Hagerty admitted that he did not know whether the paper would become the President's "last words" on the subject. It all depended on the subsequent campaign.[48]

THE INTERNATIONAL AGENCY: BORN AT LAST

As election day neared, delegates from eighty-one nations gathered at United Nations headquarters in New York, to debate the draft statute of the International Atomic Energy Agency. Convened on September 20, the conference was not a rubber stamp, even though most of the difficult negotiations among the nuclear powers had been completed by the twelve-nation working group during the previous spring. The Russians again unsuccessfully sought agency membership for the Chinese communists and reiterated their insistence that national sovereignty not be sacrificed to the international agency. For the most part, these demands were pro forma. More serious were the reservations on safeguards put forth by the Indians. This discussion occupied more than half the time of the conference.

The draft statute, which satisfied the Commission's minimum standards for safeguards, authorized the agency to approve the design of any specialized equipment or facility, as well as to require the maintenance of operating records accounting for source and fissionable materials. The agency would also have the right to request progress reports and to have access "to all places, persons, and data" necessary to determine whether diversion of materials had taken place. In the event of noncompliance the agency could suspend or terminate all assistance and withdraw both materials and equipment. In order to enforce these provisions, the agency was empowered to create a staff of inspectors who would also be responsible for enforcing health and safety measures.[49]

The Indians complained that even these relatively benign provisions might seriously interfere with the economic growth of member states. Specifically, India objected to provisions which included source materials in the accounting system and granted the agency virtually unrestricted rights over weapon-grade reactor by-products. Control over reactor "wastes" was considered essential to prevent stockpiling for weapon development. The eventual compromise involved some sleight-of-hand and judicious rewording of the technical language of the draft statute. In the end the agency retained the accountability for source materials, but was limited in its control over reactor by-products so that member states could, under continuing agency safeguards, use by-products material as needed "for research or in reactors, existing or under construction."[50]

With compromise on safeguards accomplished, the conference on October 23 unanimously adopted the statute. Once again the stage was set for a dramatic

American gesture. This time, Strauss, appearing on behalf of the President, announced that the United States would make available to the new agency 5,000 kilograms of uranium 235 to be taken from the 20,000 allotted to peaceful uses by Eisenhower in February, provided the agency and the United States could come to agreeable terms. Despite this offer, however, Gerard Smith reported that the American announcement had been received with apathy. Apparently, nations interested in developing nuclear power reactors preferred to work directly with the United States through bilateral arrangements, or through regional groups which might share the enormous costs of the plants.[51]

The successful negotiation of the statute just prior to the presidential elections, and the numerous bilateral agreements of cooperation, however, did not reveal the main thrust of America's peaceful atomic diplomacy. Officially, the United States continued to support all approaches related to the international development of the peaceful atom -- the international agency, bilaterals, as well as the Organization of European Economic Cooperation (OEEC) and other regional associations -- but under directions from President Eisenhower, the United States would continue to devote major attention to the reluctant EURATOM group.[52]

THE BULGANIN LETTER

On October 18, the same day that the President had offered his "last words" on testing, the complexion of the presidential campaign changed dramatically when Soviet Premier Bulganin wrote Eisenhower criticizing the Administration for its political stand on the subject. Bulganin professed understanding, and implied forbearance, of American electoral polemics, but he could not ignore what he claimed was deliberate distortion of Soviet policy. The Soviet premier was pointedly critical of Dulles, who was accused of making "direct attacks against the Soviet Union and its peace-loving foreign policy." Following additional polemics of his own, Bulganin renewed his offer of a test ban by endorsing the views of "certain prominent public figures in the United States." As far as the Russians were concerned, Bulganin charged, negotiation of a test ban had failed only because the United States and some of its allies had bargained in bad faith; the Americans, Bulganin charged, renounced their own proposals just when the Russians accepted them.[53]

Eisenhower was furious. Bulganin's public criticism of Dulles, and his transparent support of Stevenson were bad enough. His clumsy eleventh hour meddling in American politics was intolerable.

Lewis Strauss was in Battle Creek, Michigan, on October 19 to address a meeting of the Joint United States-Canadian Civil Defense Committee. Dulles called him to arrange a meeting that evening, however late, to discuss the President's response to the Bulganin letter. Dulles, understandably indignant at both the tone and content of the letter, wanted the President to reject the note. Strauss, however, viewed the letter as a major windfall, which, if handled carefully, could be turned to considerable advantage for the President. First, Strauss thought it extremely important that Eisenhower, not the Soviets, release the letter to the public, even if a reply were not ready. By doing so the Administration could regain the propaganda initiative. Secondly, the reply should vigorously repudiate the Russian's personal attack on the Secretary of State and the shocking attempt of a foreign government to interfere in American domestic affairs. Above all, the letter must be answered, not rejected, because the American public might interpret such a formal diplomatic response as a presidential attempt to duck the issue.[54]

On Sunday morning, October 21, Strauss, Dulles, Milton Eisenhower, Under Secretary of State Hoover, and Hagerty gathered in the President's study on the

second floor of the White House living quarters. The President and Dulles accepted Strauss' suggestions, but the hope of releasing the Soviet note in Washington had already been foiled when the Russian's published it even before Eisenhower had a reliable translation in hand. Eisenhower used this as a pretext for immediately publishing his own reply. Eisenhower's withering temper, infamous among his inner circle but rarely witnessed in public, was directed squarely at the Soviet premier with little worry about the diplomatic consequence. Eisenhower wrote Bulganin that, were he a diplomat assigned to Washington, he would have been declared persona non grata and sent packing back to Moscow. Eisenhower insisted on taking the letter personally, because it both attacked the Secretary of State and impugned the President's integrity. Still, Eisenhower expressed his willingness to keep lines of communication open despite the Russian's departure from accepted international practice.[55]

The exchange between Bulganin and Eisenhower was disastrous for Stevenson, just as Strauss anticipated. The President's white paper on nuclear weapons and disarmament was now hardly needed and contributed little to the remaining campaign or to subsequent diplomatic negotiations. From Chicago, Stevenson attempted to disassociate himself from Bulganin's ploy by denouncing the Russian's interference. Somewhat lamely, Stevenson countered that in reality Bulganin preferred Eisenhower. More to the point, the Democratic candidate declared that the hydrogen bomb remained the real issue in the presidental campaign. Unfortunately, as the Los Angeles Times commented, Stevenson had been flanked, with no retreat. It was not, of course, that anyone really believed that Stevenson was a friend of communism or had intentionally played the Russian game. Rather, in the field of nuclear weapons, Eisenhower, former Army chief of staff, commander of NATO, and President, obviously held an enormous advantage both in experience and in access to information. A special public opinion poll conducted by George Gallup indicated that Americans opposed a nuclear test ban by a two-to-one margin. There is no question that Bulganin's heavy-handedness hurt Stevenson on the test ban issue. Stevenson did not, as some had feared, derail Eisenhower's determination to seek a nuclear test ban.[56] Indeed, the presidential campaign, for all the sound and fury, probably did not delay the eventual test moratorium of 1958.

SUEZ, HUNGARY, AND THE NATIONAL ELECTION

The remainder of the presidential campaign was virtually engulfed by foreign developments, greatly to the President's advantage. The Middle East exploded on October 29 when Israel assaulted the Sinai, followed by a combined British and French invasion of Egypt near the Suez canal. Thereafter, on November 4, Russian soldiers marched into Hungary and ruthlessly trampled the revolution. Two days later on November 6 Americans reelected Eisenhower in a landslide victory that exceeded his 1952 win over Stevenson. Americans seemed both appreciative of Eisenhower for the "peace and prosperity" he had brought to the nation, and confident that he would deal firmly with the Russians and other threats to international stability.

NUCLEAR ISSUES IN POLITICS

For the first time atomic energy had become a major issue in a presidential campaign. It was no accident. Since Operation Candor and the "Atoms-for-Peace" speech in 1953, Eisenhower had self-consciously determined to include the American public in atomic energy discussions to the extent national security permitted. The awesome power of hydrogen weaponry and the great potential of the peaceful atom made it imperative that nuclear energy be a part of the nation's political agenda. Although Stevenson was unable to exploit the nuclear

issue, by the same token he was not decisively hurt by his advocacy of test ban and disarmament. With or without the nuclear debate, Eisenhower, who carried 41 states with about 58 percent of the vote, would have won reelection handily. The 1956 presidential election, however, provided Americans their first opportunity to vote on political issues involving the future of atomic energy. If not exactly a national referendum on the subject, the election clearly endorsed the atomic energy policies of the Eisenhower Administration.

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CHAPTER 14
IN SEARCH OF A NUCLEAR TEST BAN

Although the 1956 presidential election had offered a clear endorsement of Eisenhower's "peaceful" atomic energy policies, the partisan debate over a test ban and disarmament had not clarified these sensitive issues. For the most part, official secrecy still shrouded the military atom so that beyond the President's inner circle few Americans knew of Eisenhower's diplomatic strategy. Only the President's 1953 Atoms-for-Peace speech, his 1955 Open Skies proposal, and periodic reports of the continuing disarmament talks, gave any indication of the Administration's intentions.

One historian has speculated that by raising the test-ban issue, Stevenson actually may have derailed a decision by the National Security Council to seek a negotiated test-ban agreement with the Soviet Union.[1] There is no evidence, however, that election rhetoric either slowed or deflected the test-ban strategy adopted by the President's disarmament advisors in mid-September 1956. Despite his great impatience with the public posturing of both Stevenson and Bulganin, Eisenhower remained determined to seek an end to the nuclear arms race. If anything, progress towards test-ban negotiations was impeded by internal strife within Republican ranks, and not by Democratic campaign criticism. After Nixon's renomination and election as Vice-President, Stassen's position as Eisenhower's special advisor on disarmament became increasingly tenuous. Stassen did not lose the President's confidence immediately, but his open opposition to Nixon's candidacy helped Strauss and others to exploit resistance to Stassen's disarmament plans. Yet, even as the President gradually lost confidence in Stassen's judgment, Eisenhower's commitment to a nuclear test ban remained unchanged.

The presidential campaign, however, did promote greater public understanding of radioactive fallout. Although public opinion polls indicated that Americans generally opposed a nuclear test ban, a survey of the presidents of scientific and technical organizations in the United States indicated that 57 percent of the respondents favored either halting or limiting the testing by all nations. In the October 1956 Bulletin of the Atomic Scientists, Ralph Lapp described the Commission, like Macbeth, as "haunted by the ghost of things which will not die." The specter in this instance was radioactive strontium 90, which Lapp reported was turning up in the bones of people all over the world. Using data provided by Libby and others of the Commission, Lapp concluded that some limitation of the test program was urgently needed "to preserve the sanctity of the biosphere."[2]

In the final days of the campaign, Senator Clinton Anderson charged that the Commission had purposely suppressed an unclassified report on the radiation effects of fallout from hydrogen bomb tests. Anderson's charges were blatantly partisan. Actually he was seeking an advance copy of the chapter on radiation effects of fallout in the Weapons Effects Handbook, due to be published early in 1957. Acting General Manager Richard W. Cook explained to Anderson that he could not release the draft chapter because it had not been cleared by either the Commission or the Department of Defense, a co-sponsor of the handbook. Anderson insisted that the President order the Commission "to make the true facts public immediately while this important issue is being debated." Having made his point, Anderson later expressed his willingness to settle for the most recent fallout information if the draft of the Weapons Effects Handbook were unavailable.[3]

EISENBUD'S "SUNSHINE SPEECH"

As a result of the political controversy and public debate over fallout, the Commission's general advisory committee, at the insistence of Edward Teller, decided to issue a statement on fallout to be published after the elections. The committee emphasized that radiation effects from tests at no time exceeded those from natural causes, a fact which the National Academy of Sciences had already confirmed. Confidently, the committee noted that no "objective" criticism of the Academy's report had yet been published. Furthermore, the committee pointed to encouraging progress made during the Redwing tests towards developing nuclear weapons with reduced fallout--the so-called "clean bombs."[4]

Thereafter, on November 15, 1956, Merril Eisenbud, manager of the New York operations office, addressed the Washington Academy of Sciences on worldwide distribution of strontium 90. Eisenbud, who was in charge of the Commission's radiation monitoring program, acknowledged that strontium 90 was the most hazardous of the nuclides formed in the fission process. Project Sunshine had analyzed the physical and biological behavior of strontium 90 as it traveled from the nuclear fireball through the atmosphere into the soil, up through the food chain, and finally via human metabolism into bone.

Using research and sampling techniques slightly different from Libby's, Eisenbud came to the similar conclusion that through 1956 fallout from nuclear testing had not proven hazardous to human health. Libby had estimated that four to ten micromicrocuries of strontium 90 per gram (mmc/g) of calcium could concentrate in bones in persons throughout the United States within ten to fifteen years. Using data gathered on the North Dakota milk shed, where the greatest concentration had occurred, Eisenbud predicted an eventual concentration of 25 mmc/g. Either value was less than the maximum permissible body burden of 100 mmc/g established by the National Committee on Radiation Protection and the International Commission on Radiological Protection. In his summary, Eisenbud noted that over a period of seventy years the highest estimate of skeletal accumulation that could be predicted from the devices already detonated was only 7 percent above the highest estimate received from natural background radiation. The Sunshine[5] studies had indicated that the estimate could also be as low as 0.7 percent. The implication of Eisenbud's speech was clear: testing had created only slightly greater hazards from radioactivity than mother nature herself.

The importance which the Commission gave Operation Sunshine was demonstrated a few days later when the general manager requested an additional $2,000,000 for the biology and medicine program. Both Libby and Murray observed that Operation Sunshine ranked next to the weapon program in priority. Libby even suggested that the Commission issue a staff directive stressing the high priority of Sunshine. Although not all of the additional appropriation would go directly to Sunshine, over three-quarters of the funding would directly or indirectly support its activities. Curiously, given the project's high priority and the Commission's responsibility to keep the Joint Committee "fully and currently informed," the Commissioners also decided it was not appropriate to notify the Joint Committee of their action. Concurrently, Gioacchino Failla, chairman of the advisory committee on biology and medicine, called a special meeting, including the Commissioners and the general manager, to evaluate the status and implications of Project Sunshine with the hope of developing a public statement. Eisenbud's November 15 speech served as the basis of the advisory committee's discussions.[6]

THE DANGERS OF FALLOUT

When the advisory committee on biology and medicine examined both Eisenbud's and Libby's statistics, a disconcerting conclusion emerged. Although the members had no doubt that radiation levels from testing in the United States and worldwide were well within safe and established limits, they also noted that additional testing might well exceed permissible limits. H. Bentley Glass, a distinguished geneticist, was the first to observe that if testing continued at the same rate as it had for the past four years, the permissible limits would be exceeded within 28 years. The problem with Eisenbud's and Libby's studies was that they analyzed only past testing, and did not consider continued or future testing. The implication of Glass's simple arithmetic was so startling, however, that even he cautioned that he might "be entirely wrong."[7]

When Murray and Strauss joined the afternoon session, Failla explained the apparent dilemma. The advisory committee remained confident that there was "no appreciable danger" to world population from previous nuclear tests. On the other hand, some members were worried that additional international testing could increase the amount of strontium 90 in the bones of children above acceptable limits within fifteen to twenty years. In short, unless the standards themselves were altered or testing significantly reduced, body burdens of strontium 90 worldwide were likely to rise to levels that were too close to the limits for comfort. Murray brushed aside Failla's comments, reminding the advisory committee of the Plumbbob tests scheduled for Nevada in the spring of 1957. Murray had no data that the Plumbbob tests would add significantly to the fallout problem. "I would not want anything to happen that would disturb the going ahead with those tests in the spring," he warned the group. "That is our immediate problem, and I don't think anything will interfere with us going ahead."[8]

Strauss was far less categorical and infinitely more diplomatic with the committee members, but he hardly encouraged them to rush to judgment with their findings. When Failla asked how urgent it was for the committee to issue a public statement on worldwide fallout, Strauss replied that a statement was in order "whenever the committee is convinced that it has all the facts." Strauss thought there was no urgency for a statement that could not be supported "by facts in hand." Unfortunately, Failla continued, there would always be speculation, rather than absolute knowledge, concerning the effects of radioactive fallout because most of the data were obtained from animal experiments instead of human experience. Strauss carefully reminded the scientists that their professional responsibility required them to give the Commission the benefit of their "best judgment, whatever it may be." He then added that as far as he knew, the committee had received no urgent request from the Commission for a public statement. In effect, Strauss reenforced Murray's injunction against issuing a public statement without actually doing so. Not surprisingly, the advisory committee decided not to release a public statement on the hazards of worldwide fallout, but instead offered an internal report to the Commission recommending continued studies of the biological effects of low doses of strontium 90. Given the uncertainties and statistical limitations of the problem, the committee did not expect "to produce definitive results for many years."[9]

Throughout the winter and spring of 1957 the advisory committee on biology and medicine remained uncertain about how best to advise the Commission, the general advisory committee, and the public on the hazards of radioactive fallout. The general advisory committee was particularly anxious to have a statement it could endorse. Yet, even after two more long sessions on the subject in January and March, no one really knew what the effects of low-level

radiation from strontium 90 might be. Failla speculated that there were no thresholds for various radiation effects such as bone tumor or leukemia, but this hypothesis could not be proven. At best, the Commission would have to continue to study the matter in hopes that within a year or two research would yield publishable results.[10]

When Senator Richard Neuberger proposed an independent institute responsible for nuclear health and related research and training, the advisory committee opposed the idea on the grounds that it would duplicate the Commission's existing programs and facilities. The committee was fully aware that Neuberger's proposal reflected criticism either that the Commission was not doing its job, or that it was improper to combine weapon testing and public health protection in the same agency. Either way, the advisory committee declined comment on Neuberger's bill, confident that the Joint Committee on Atomic Energy would block any action.

Failla, however, was sensitive to the potential conflict of interest between those who managed the weapon tests and those who were responsible for health and safety. When Failla suggested that Eisenhower should appoint an independent committee to advise him on the safety of testing, Strauss noted that it was already too late to review plans for Operation Plumbbob. Shields Warren objected to establishing an advisory committee between the President on the one hand and the Department of Defense and the Commission on the other, but he thought that there should be some way "to get word to the Commissioners" that the military's unlimited demands for testing were damaging world opinion. Warren, normally a staunch defender of the Commission, joined those who were worried whether all of the atmospheric tests were militarily necessary.[11]

In his remarks to the Sunshine study group in February, Libby summed up the significance of the Commission's radiation studies. "Next to weapons," Libby stated, "Sunshine is the most important work in the Atomic Energy Commission." Libby believed that unless the problems surrounding fallout were understood and clearly explained to the public, the testing program might be forced to stop "which could well be disastrous to the free world."[12] Libby correctly sensed the urgency of the moment, but he missed completely the depth of Eisenhower's commitment to seek an end to testing. For Libby and the members of the advisory committee on biology and medicine, the most pressing issues were scientific, not moral. But for Eisenhower, the radiation studies, although important, would hardly be decisive in shaping his strategy for controlling the nuclear arms race. Even if Sunshine were to prove that atmospheric testing was safe, the President had set his own course to stop testing as an explicit step towards arms control and peace.

STASSEN AND DISARMAMENT

In contrast to the fruitless efforts of the Commission's advisory committee on biology and medicine, the President's disarmament advisors gained headway after the national elections. Although the disarmament committee had missed its October 15 deadline, within a fortnight of Eisenhower's reelection Stassen had presented the President a revised version of his June 29 disarmament proposals.

By that time the Soviet Union also adopted new policies which were to pave the way for the 1957 disarmament negotiations. On November 17, Andre Gromyko informed Eisenhower that the Soviet Union was willing to discuss the possibility of establishing "open skies" over both NATO and Warsaw Pact countries. Thus, although the "Spirit of Geneva" had been shattered by the Hungarian revolution, the Mideast war, and the acrimonious correspondence between Bulganin and Eisenhower, the great powers were quietly seeking common ground for disarmament discussions.[13]

The pace of disarmament quickened after the American election. Euphemistically, Eisenhower called the three weeks between October 20 and November 8 "Twenty Busy Days." Preoccupied by war and politics, governmental leaders still made progress towards disarmament. On November 21, not yet two weeks since fighting ceased along the Suez Canal, Eisenhower approved Stassen's revision of the disarmament plan, which included a commitment to seek a nuclear test ban. At the United Nations, the Norwegian Delegate Lange suggested on November 27 that nations should register all nuclear weapon tests with the United Nations. Registration would not only serve as a first step towards test limitations, but would also enable the United Nations to alert member states so that accurate measurements of worldwide fallout could be obtained. Canadian endorsement of the Norwegian proposal, suggested that perhaps some limitations on testing could be established. On December 19, Stassen informed Canadian Ambassador Heeney that the United States was willing to explore the possibility of registering tests, but that the Americans hoped that Canada would consult with the United States before formally advocating test limitations.[14]

The President's disarmament proposals were officially made public on January 14, 1957, when Ambassador Lodge outlined them before a First Committee of the United Nations General Assembly. Lodge offered five proposals for the disarmament negotiations scheduled to convene in London in March. The first was to control the production of fissionable material for weapons. Lodge expressed America's hope to reduce weapon stockpiles and to limit the production of fissionable material to peaceful uses under international supervision. If the nations could agree on international controls of fissionable material, then they might be able to limit, and eventually eliminate, all nuclear test explosions. Other proposals included reducing conventional forces and armaments, limiting outer space to peaceful research and exploration, and establishing international safeguards against surprise attack. All proposals, of course, were contingent on establishing acceptable provisions for inspections or verifications. Lodge also indicated the United States' willingness to seek a compromise between Eisenhower's air inspection system and Bulganin's plan for fixed ground observation posts.[15]

In contrast to his dramatic success in drafting the Administration's new disarmament policy with a commitment at least to discuss limiting nuclear testing, Stassen suffered serious political setbacks following the presidential election. His unsuccessful opposition to Nixon's renomination had already raised serious questions about his usefulness to the Eisenhower team. Dulles no doubt surveyed Stassen's liabilities and the Administration's options when he included the "future status of Mr. Stassen" on his agenda of "Matters to be raised with the President" on December 2, 1956.[16]

Several weeks later Eisenhower and Stassen had a long, and in the President's words, "brutally frank" talk about Stassen's conduct. Stassen assured Eisenhower of his unconditional support of the President, and asserted that his troubles stemmed from the fact that he had been uncompromising in pursuing Eisenhower's disarmament goals, while others had dragged their heels hoping the President would change his mind. There was sufficient truth in Stassen's analysis to reassure Eisenhower of his disarmament advisor's good intentions. In a telephone call to Dulles shortly after his interview with Stassen, Eisenhower expressed confidence that Stassen was not then politically ambitious. Stassen may have made mistakes, Eisenhower confided to Dulles, but not because he was disloyal to the President.[17]

Dulles remained unhappy with Stassen's freewheeling style, and he told Stassen that same day that the Secretaries of State and Defense had been given

presidential authority for public relations related to disarmament.[18] Increasingly Dulles found Stassen's semi-independent status intolerable.

Matters came to a head on January 28, 1957, when Stassen, unable to suppress his antagonism towards Nixon, publicly blamed the Vice-President for the Republicans' congressional losses in the 1956 elections. Stassen reiterated that if Christian Herter had been Eisenhower's running mate, the Republicans would not only have regained a majority in Congress, but also would have won more governorships and local elections. Predictably, Stassen's televised interview created a furor within the President's inner circle.[19]

With the London disarmament talks scheduled to begin in less than two months, Eisenhower had to decide how to deal with Stassen. Obviously, the President did not want to discredit his disarmament advisor on the eve of promising negotiations. Yet he could no longer ignore Stassen's open criticism of the Vice-President. Somehow, he had to find a way to discipline Stassen without destroying his effectiveness at the bargaining table. Eisenhower's solution was brilliant. With Stassen actually involved in United States diplomacy, the President decided that his disarmament advisor could be transferred from the White House to the Department of State. This meant not only that Dulles would now have more control over Stassen, but also that Stassen would attend neither Cabinet nor National Security Council meetings unless the agenda specifically included disarmament questions. Thus, Eisenhower saved his disarmament advisor from dismissal, strengthened Dulles' hands in the forthcoming negotiations, and vindicated Nixon without causing any serious political damage.[20]

The President apparently molified Stassen as well. Although transferred to the State Department where he ranked below the Under Secretary of State, Stassen was allowed to keep his original title as special advisor to the President. Eisenhower generously urged him gradually to reduce his attendance at Cabinet and National Security Council meetings so that there would be no abrupt or obvious change in Stassen's status. For his part, Dulles encouraged Stassen to attend his staff meetings. Rather pointedly, Dulles stated that he expected "complete loyalty to State Department policies" whether or not Stassen always agreed with them. Although he acquiesced to the changes, Stassen continued to protest that he always tried to be loyal, and that reports of his disagreement with Administration policy were completely without basis.[21]

PREPARATIONS FOR LONDON

Although Eisenhower had approved the Administration's new disarmament plan on November 21, 1956, the details had to be hammered out within the government and between the United States and its allies before confrontation with the Soviets in London. The Atomic Energy Commission was uneasy about the President's proposal to limit or eliminate testing contingent upon achieving agreement in other areas of disarmament and establishing an acceptable inspection system. In the meantime, the United States would propose that each nation announce its tests in advance and permit a limited number of international observers to witness the tests. When Stassen asked the Commission to develop recommendations for implementing the President's plan, the Commissioners were able to use the request as a way to contest the proposals without directly opposing the President.[22]

The Commission had ample reason for being nervous. Even without an international agreement, the President on the day after Christmas had expressed some doubt about the advisability of authorizing operation Plumbbob, a series of twenty-five tests which Strauss had indicated would be conducted in Nevada starting on May 1, 1957. Dulles explained that nearly all of the tests would be

small and confined to the continental United States. The Secretary of State anticipated no difficulty because recent Soviet tests had provoked little comment.[23]

The Commission was not enthusiastic about any of the testing proposals, and its fundamental position remained unchanged from that expressed to Stassen the previous July. On January 23, 1957, the majority of the Commissioners informed Stassen that they did not believe that the United States should agree to a moratorium on testing independent from a comprehensive disarmament agreement which included inspections and safeguards. They were less adamant about the possibility of placing limitations on testing. An ad hoc disarmament committee appointed to explore various options on limiting testing reported that it was impossible to predict what means might be technically acceptable in the future. Simply limiting the number of tests without at the same time restricting the amount of fallout allowable did not appear practical to the Commission's staff. On the other hand, assuming reciprocity from the Russians, the staff anticipated no great problems in admitting observers at the tests, provided they were not permitted to photograph or otherwise record observations that revealed design information.[24]

The British, too, were wary of the forthcoming disarmament talks. A delegation headed by Ambassador Harold T. Caccia proposed that the two nations adopt a common position in response to any Soviet offer. Thus, as the disarmament conference convened in London, Eisenhower flew to Bermuda for talks with Prime Minister Harold Macmillan, who had succeeded Anthony Eden after the Suez disaster. Nuclear testing was a major item on their agenda, and Eisenhower was inclined to be conciliatory towards Macmillan.[25]

Gerard Smith recommended that the two leaders issue a joint statement reflecting Anglo-American restraint on testing. In their joint statement from Bermuda, Eisenhower and Macmillan affirmed the necessity of continued nuclear testing in the absence of an international disarmament agreement, but they followed Smith's advice by promising to contribute only a small fraction to permissible levels of worldwide fallout. Gratuitously, they assumed the Russians would do the same. Finally, in concert with the proposals Stassen was offering in London, they expressed their willingness to accept the Norwegian plan to register tests with the United Nations and to allow international observation of the tests if the Soviet Union would do the same.[26]

LONDON DISARMAMENT CONFERENCE

When the United Nations disarmament subcommittee convened its longest, most significant, and final meeting in London on March 18, 1957, prospects for success were not bright. The Western alliance had been severely tested by the Suez crisis. The French were fighting in Algeria while suffering recurrent crises at home. The British, short of manpower and staggering under their defense budget, had already decided to rely primarily on their nuclear deterrent and had announced that they would be testing and manufacturing a megaton weapon during 1957. The Soviet Union, which had begun a new series of weapon tests in August 1956, exploded six devices in March on the eve of the conference, almost in cynical defiance of the negotiations. For its part, the United States planned to launch the Plumbbob series in May on schedule. All the while, with the Federal Republic of Germany as the new NATO partner, the western alliance faced decisions on nuclear stockpiles and missile bases in Europe. The pall of the Hungarian Revolution still darkened the prospects for peace, and although Eisenhower was determined to persevere in "waging peace," few outside of his inner circle were aware of the depth of the President's commitment.

To complicate matters more, just before departing for the conference, Stassen unaccountably announced that he would be seeking the Republican nomination for governor of Pennsylvania. Although there was no reaction to Stassen's announcement from either the White House or the State Department, the American delegation reportedly anticipated that the disarmament conference would end by late April.[27]

Within this bleak atmosphere there was reason for optimism on the American side, and for most outsiders it would have seemed to rest with an unlikely personage, no one other than John Foster Dulles. Although infamous for having coined the phrase "massive retaliation," Dulles had not initially played a dominant role in shaping Eisenhower's "peaceful atomic diplomacy."[28] First, Strauss and then Stassen had that responsibility. Preoccupied by a series of international crises, Dulles had only gradually gained mastery of the moral and technical complexities of nuclear politics on the international level. By the spring of 1957, with Stassen transferred to the State Department, and Strauss isolated by inflexible positions on testing, Dulles, despite his recent bout with cancer, emerged as the President's most dependable disarmament champion. While Stassen and Strauss increasingly voiced the extremes of disarmament and international nuclear policy, Dulles, under the shrewd tutelage of Gerard Smith, kept to the middle road occupied by the President.

Before the London talks opened, Dulles cautioned Stassen to limit his discussions to the proposals which the President and the National Security Council had approved on November 21, 1956. But before the London Conference was two weeks old, reports began to filter back to Washington that Stassen appeared to have exceeded his explicit instructions. Alarmed, Gerard Smith confirmed that no one in Washington had cleared what appeared to be new proposals put forward by Stassen. Apparently, after Stassen offered the American proposals, Valerian Zorin, the Soviet representative, called for an "immediate and unconditional halt to tests, without any inspection." Stassen, eager to pursue any opening, did not preclude discussing the Russian's suggestion that a test ban might be the first step towards disarmament, not the last.[29]

Strauss was angered and alarmed by Stassen's willingness to discuss concessions on the testing issue before an agreement on inspection and verification had been made. He complained bitterly to Dulles, requesting that the Secretary of State call his emissary home for discussions during the Easter recess. Dulles conceded that Stassen was an "elusive fellow" given to overloading the Secretary of State with cables so that he could document that Dulles had been put on notice. Uncertain as to what was happening in London, Dulles agreed to call Stassen back "to find out what is going on."[30]

Captain John H. Morse, Strauss' special assistant, suspected that Stassen was either confused or intended to confuse. After analyzing disarmament cables from London, Morse concluded that Stassen wanted not only authority to abandon effective inspection, the keystone to the American position, but also personal freedom of action to negotiate the timing and extent of departure from the toughest American demands. Morse confessed, however, that Stassen's purpose "if it exists, is well disguised - and perhaps accounts for the unusually obtuse wording of the proposal."[31]

STASSEN RECALLED

Stassen returned to Washington under a cloud of suspicion to defend his actions on April 20. There had been an atmosphere of hopelessness in London when he first arrived, Stassen explained, and everyone anticipated short meetings and quick adjournment. Gradually, however, it became apparent that the Russians were interested in the possibility of reaching a "first step

agreement." On April 12, Zorin had personally told Stassen that the United States' proposals were receiving serious consideration in Moscow. Three days later, Zorin announced he would return to Moscow during the Easter recess for consultation. Stassen anticipated that when Zorin returned to London the Russians would be amenable to an inspection system which did not undermine their regime either at home or in eastern Europe. The Soviet envoy had already indicated willingness to negotiate separately on the major obstacles to a disarmament treaty, including outlawing nuclear weapons and abolition of foreign military bases. In general, Stassen was encouraged that the London Conference might yet advance four American objectives outlined by the Secretary of State: (1) limiting the spread of nuclear weapons; (2) reducing United States' vulnerability to surprise attack; (3) lifting the Iron Curtain slightly; and (4) setting the stage for further negotiations to ease Cold War tensions.[32]

Stassen did not believe that a first step toward disarmament involving a limited test ban and cessation of uranium enrichment for nuclear weapons would significantly reduce the nuclear weapon capability of either the United States or the Soviet Union. The greater problem, in Stassen's opinion, would be to get other countries, such as France, to go along. French Foreign Minister Jules Moch had informed him that France would be ready to test its first nuclear weapon by 1959, and that unless some agreement were reached in six months, France would pass the point of no return in the development of nuclear arms. Because other nations would be certain to follow, Stassen now supported a twelve-month limited suspension of nuclear tests and production of fissionable materials, a delay that he thought would involve small risk until a reliable inspection system was adopted.

Strauss, supported by Abbott Washburn of the United States Information Agency, argued that once a test moratorium was established public pressure both at home and abroad against resumption of testing would be tremendous. According to Strauss, a year of testing would be lost just when the United States was on the threshold of developing a relatively "clean" thermonuclear weapon. Strauss expressed his willingness to negotiate a test limitation, but he adamantly opposed a test ban which would ultimately cripple the Commission's laboratories and permit top scientists and engineers to drift away. The Russians, who Strauss claimed could keep their laboratories at full strength by simple fiat, could break any agreement and end up far ahead of the United States. If tests were limited by number, size, or fallout, however, Strauss believed some agreement might be possible. While Strauss continued to minimize the health dangers related to atmospheric testing, Stassen reminded the group that a major international scientific debate on that very subject was far from settled.

First among Dulles' concerns at the April 20 meeting was the so-called "fourth" or "n-th" country problem. Here Dulles observed, was an important common ground between the United States and the Soviet Union. Both countries were concerned about the implications of nuclear weapons in the hands of "irresponsible" powers, not because they could seriously threaten either the United States or the Soviet Union, but because rash actions might plunge everyone into all-out war. From Dulles' point of view, even if the United States and the Soviet Union failed to achieve substantial disarmament agreement, any successful steps towards eliminating the "fourth" country problem would justify taking some risks.

Following the meeting, Dulles asked to see Stassen privately. Alone, Dulles rebuked Stassen for offering "personal" proposals, which could prove highly dangerous should the Russians accept an idea that the President could not endorse. The Russians had already accused the United States of retreating from positions after the Soviet Union had accepted them. Dulles wanted no possible

embarrassment to the Administration, especially since the Senate had not been thoroughly briefed on the progress of the London discussions.[33]

Later, Stassen also met with the President before returning to London. Covering much the same ground as he had on April 20, Stassen related his optimism over the Soviet Union's willingness to engage in serious negotiations. Stassen's report was obviously good news to the President, who expressed as much worry over the reactions of officials at State, Defense, and the Commission as he did over the response of America's allies or the Russians themselves. Especially on the testing question, Eisenhower thought that the United States might be the hardest nation to convince on the limitation of tests. Unlike other countries which tested purely for military reasons, Eisenhower observed that American scientists were fascinated by the basic research which the tests made possible -- research that often transcended its military significance. Indeed, because peaceful and military research were often so interrelated, Eisenhower speculated that the unlimited right of inspection might be essential to any disarmament agreement.[34]

STASSEN'S NEW PROPOSAL

By May 9, 1957, following his return to London, Stassen at Dulles' request prepared a new formulation of the United States' position on arms limitation and control. In a personal telephone call to the President at Gettysburg, Dulles commented that Stassen's new plan was "much too grandiose" and went far beyond anything practical at the time. Nevertheless, Dulles granted the need to revise the American position, and recommended calling Stassen back to Washington for another round of interagency discussions.[35]

Dulles, Stassen, Strauss, Robert Cutler, Secretary of Defense Wilson, and Allen Dulles of the CIA gathered on May 17 to review, paragraph by paragraph, Stassen's May 9 recommendations. Stassen reported enthusiastically that the Russians were genuinely interested in reaching an agreement, and that the leaders of the other western delegations also hoped for real progress in the negotiations. According to Stassen, during the crisis in Suez and Hungary, the Soviets found themselves looking down the "barrel of atomic war." Much to the surprise of both Dulles brothers, Stassen reported that the Russian leaders were not worried about direct conflict with the United States; they believed that even an irresponsible administration in Washington would not attack the Soviet Union unless the United States was prepared to follow through on land in Europe to finish off the Russians. What the Soviets feared most was that a crisis in Germany, Poland, Europe, or elsewhere might pull them into nuclear war with the United States. Although the Soviets appeared in no hurry to reach an agreement with the United States and its allies, Stassen did not think they were stalling. Rather, the Russians were constantly wondering whether the United States was stalling and whether the Americans were serious.[36]

In order to demonstrate clearly the United States' commitment to arms limitation, Stassen wanted to reformulate the President's November 21, 1956, disarmament policy to strengthen anti-proliferation measures, increase international safeguards against surprise attacks, and not incidentally, open up the Soviet Union and Eastern Europe. For the most part, where Eisenhower's November 21 disarmament policy had provided general guidelines for negotiations, Stassen sought to establish definite strategy and firm language. With respect to "open skies," for example, Stassen proposed opening to aerial inspection limited portions of western Russia and Europe, and all of the Soviet Union north of the Artic Circle and east of Lake Baikal, matched by an equal area in the western United States, Alaska, and Canada. Stassen also developed similar details and proposed time tables concerning the establishment of ground control

posts, exchange of military blueprints, reduction of armed forces and armaments, and sharing of information relative to movement of troops on land, sea, and air. All signatories (with the exception of the United States, the Soviet Union, and the United Kingdom) would agree never to manufacture or use nuclear weapons. The three nuclear powers, for their part, would agree to a moral pledge not to use nuclear weapons except in self-defense, but rather would devote all future production of fissionable material exclusively to non-weapon or peaceful uses. All aspects of Stassen's new proposals but one required the establishment of satisfactory inspection systems before they would become affective. In a bold departure from previous American policy, Stassen now advocated that the United States accept Zorin's invitation to suspend all nuclear tests for one year without prior agreement on an effective verification system.[37]

COMMISSION REACTIONS

For more than a week in mid-May 1957, the Eisenhower Administration once again labored over its disarmament policy. And again, Strauss struggled above all else to protect the Commission's nuclear testing program. As he informed Gerard Smith, if the aerial inspection proposals were "fuzzy" and made no sense, Stassen's call for a test moratorium without verification was completely unacceptable to the Commission. While the Atomic Energy Commission limited its comments to nuclear-related issues, Secretary of Defense Wilson attacked on a broader front by declaring that, despite the prolonged study and deliberation which had established the outer limits of American disarmament policy approved by the President on November 21, 1956, Stassen's new draft went "well beyond" anything that was sound or realistic for long-term agreement.[38]

On the test moratorium, the Commission was unanimous in support of Strauss. Libby had already reported that the Commission had obtained "no useful fallout information in Operation Redwing." In addition to intensive fallout studies planned for Operation Plumbbob in the fall of 1957, Libby announced that a "prime objective" of Operation Hardtack, scheduled for 1958, would be to establish accurate data on local fallout so that it could be distinguished from worldwide fallout. Murray, who had angered his fellow Commissioners with an article in Life magazine criticizing the United States for its reliance on hydrogen bombs, reminded the Commission that he continued to believe that the United States should unilaterally abandon tests of multimegaton thermonuclear weapons. At the same time, without safeguard agreements with the Soviet Union and other nations, Murray actually favored "greatly accelerating" tests of small, tactical weapons. Commissioner Vance added that a test moratorium might actually obstruct a disarmament agreement because the United States would be severely hampered in developing small nuclear weapons as suggested by Murray. Major General Alfred D. Starbird, director of the division of military application, probably best summed up the Commission's perception by observing that not only would a moratorium jeopardize weapon programs and laboratory budgets, but also that once a moratorium on testing was accepted, strong public opinion would probably prevent resumption of testing unless the United States was overtly provoked by a foreign country.[39]

THE SCHWEITZER APPEAL

While the London disarmament conference met, and the American and Russian negotiators continued to search for policies acceptable both to their governments and to their adversaries, international opposition to nuclear testing continued to mount. In March 1957, the Japanese government had sent Professor Masateshi Matsushita on a special mission to the nuclear powers to request an end to nuclear testing. In April, Prime Minister Nehru of India

again called for an end to testing, while the British Labor Party advocated halting thermonuclear testing by international agreement despite the fact that the United Kingdom was about to test its first hydrogen bomb. In the same month, leading West German nuclear physicists, including Otto Hahn, pledged they would neither construct nor test nuclear weapons.[40]

The most dramatic appeal came from Albert Schweitzer, the world-famous musician, doctor, and philosopher in French Equitorial Africa. At the urging of Norman Cousins, editor of the Saturday Review, Schweitzer requested the Nobel Peace Prize Committee to provide a platform which would permit him to speak his conscience on testing. Schweitzer, who had been awarded the Nobel Peace Prize in 1952, was granted his request, and on April 24, 1957, Gunnar Jahn, chairman of the Norwegian committee, read the great humanitarian's appeal over Radio Oslo. Although beamed around the world to fifty countries, Schweitzer's message was not heard in the United States. With the exception of the Saturday Review, which printed the verbatim text, his statement was largely ignored by the American press. In India, however, Schweitzer's words received wide circulation. Within a few days the Pope endorsed his stand, and on May 10 the West German Bundestag asked the nuclear powers at the London disarmament talks to suspend testing. As if to reply, the British detonated their first thermonuclear test at Christmas Island on May 15 with an assurance by Prime Minister Macmillan that the fallout from the test was "almost negligible."[41]

At the Commission, Willard Libby, also a Nobel laureate, assumed personal responsibility for responding to Schweitzer. In an open letter, which received more press attention in the United States than did Schweitzer's original broadcast, Libby appealed to Schweitzer's scientific objectivity. Reiterating the data he had already made public and would again summarize before the American Physical Society on April 26, Libby argued that radiation exposure from fallout was much less than that required to produce observable effects in the general population. As the New York Times noted, testing involved taking some risks. But, as Libby asked rhetorically. "Are we willing to take this small and rigidly controlled risk, or would we prefer to run the risk of annihilation which might result if we surrendered the weapons which are so essential to our freedom and our survival?"[42]

Although Libby's response did not satisfy everyone, he was addressing the key issues. American scientists were becoming more concerned that the long-term effects of fallout would be far greater than Libby estimated. Even before Schweitzer's appeal, five Yale University biophysicists expressed their concern over the irreversible effects of radioactive fallout. Although the Yale professors did not advocate an immediate test ban, one of Libby's former students, Harrison Brown, professor of geophysics at the California Institute of Technology, sided with test ban advocates when he challenged his mentor in the same issue of the Saturday Review which reprinted Libby's reply to Schweitzer. Obviously hurt by his student's rebuttal, Libby wrote Brown that his article was "pretty unobjective," but nevertheless conceded that Brown had "put the question pretty squarely." The question, of course, was what risks should Americans take in the pursuit of national security.[43]

On the same day that the British thermonuclear test thundered over Christmas Island, Linus Pauling, another Cal Tech scientist and Nobel Prize winner, told an honors assembly at Washington University in St. Louis that he opposed nuclear testing on humanitarian rather than scientific grounds. Acknowledging his debt to Schweitzer, Pauling stated that no human life should be risked in the development of nuclear weapons "that could kill hundreds of millions of human beings, could devastate this beautiful world in which we live." Encouraged by the response from the university audience, Pauling decided

to circulate a petition among American scientists calling for an end to nuclear tests. With the assistance of biologist Barry Commoner and physicist Edward Condon, both professors at Washington University, Pauling obtained in a few weeks the signatures of almost two thousand scientists, including Nobel laureate Hermann Muller and Laurence H. Snyder, president of the American Association for the Advancement of Science.[44]

THE COMMISSION MODERATES ON TESTING ISSUE

The Commission's testing program came under increasing pressure, not only from the White House and the scientific community, but also from the Congress. On March 7, 1957, the Joint Committee had announced it would hold hearings "to educate the Committee and the public" about the origins and hazards of radioactive fallout. Although the committee repeatedly insisted that its only purpose in holding the hearings would be to gather scientific information, the Commission could see the obvious implications that the hearings might have for American negotiators at the London disarmament talks. Accordingly, the Commission decided to prepare a "fall-back position" rather than risk being forced by the President to accept Stassen's plan for a test moratorium as a first step towards arms control. Although unable to find an acceptable formula for halting weapon tests without reliable inspection, the Commission was prepared to accept a limitation on tests by the nuclear powers to 15 megatons per year.[45]

Before the Commission could even offer its "fall-back position," however, Stassen once again seized the initiative by offering modifications and clarification to his May 9 proposals. He anticipated the Commission's shift by proposing that resumption of limited testing be permitted after a twelve-month moratorium, providing advance notice was given and all tests were conducted with due regard to health. Strauss now devised his own "fall-back position" which he shared with Libby: the United States should accept an unverified testing moratorium only on the condition that the Commission would resume testing after twelve months if adequate inspection controls were not devised. In that way, Strauss believed the Commission could resume testing without appearing to violate the disarmament agreement.[46]

THE STASSEN PLAN DEBATED

On May 23, 1957, Stassen presented his newest disarmament proposals to the National Security Council. With Eisenhower present, Stassen reviewed the progress of the recent negotiations in London. The great question yet to be answered, Stassen said, was whether the United States would be willing to take the necessary risks involved in the first steps towards disarmament. Dulles noted that considerable disagreement remained within the government but he expected the differences could be ironed out before Stassen returned to London. Throughout the meeting, which Strauss silently attended, Eisenhower probed deftly into the details of Stassen's plan. He also repeated his determination to halt the arms race, not just for moral but also for fiscal reasons. Secretary of the Treasury George Humphrey had warned him of severe budgetary and financial problems if military spending were to continue unchecked. Risks with the Russians were great, Eisenhower conceded, but so were the risks to the American economy in inflated defense budgets. The negotiations in London were no mere intellectual exercise, he noted in closing. "We have got to do something."[47]

Economic imperatives were also beginning to motivate the Russians. From London, American Ambassador John Hay Whitney reported that according to Prime Minister Macmillan, the Russians faced "real economic problem[s]" of their own.

The Soviet leaders were beginning to talk seriously of disarmament, but Macmillan was pessimistic that anything constructive would come from the London conference. He predicted that only a summit conference devoted solely to arms control could break the disarmament deadlock.[48]

Shortly after Macmillan and Whitney talked at 10 Downing Street, Eisenhower and Dulles met alone late one evening at the White House to review Stassen's proposals. With the President scheduled to meet his disarmament advisors the following morning, May 25, Dulles was anxious to iron out his differences with Eisenhower ahead of time. By coordinating his presentation with the President, Dulles hoped to avoid the embarrassment of seeing his ideas "hacked away" before Eisenhower had time to focus on the issues. While Dulles discussed the agenda with the President, Strauss was also working behind the scenes to line up supporters for the continuance of testing. General Herbert B. Loper and Admiral Radford assured Strauss that Deputy Secretary of Defense Donald Quarles would join the Commission in opposing Stassen's proposal to suspend testing prior to agreement on inspection and verification. Strauss may not have been optimistic about his chances on the testing issue, but he was confident that he had the solid support of the Defense Department.[49]

On Saturday morning, May 25, Eisenhower met with a large group of advisors to discuss disarmament policy. Working from Stassen's May 9 proposal as amended on May 22, Dulles in turn reviewed each issue with the exception of testing. With the toughest question temporarily set aside, Dulles led the group through the next most difficult maze: how to implement Open Skies through aerial inspections and exchange of blue prints. Eisenhower apparently favored opening all of the United States and the Soviet Union to mutual overflights, as well as exchanging comprehensive "blueprints" of military installations, stockpiles, and armaments. From the American point of view, the United States would have gained much and lost little from such an exchange. If the Russians insisted that to be comprehensive Open Skies would have had to include American overseas bases and allies, the United States would insist upon including Communist China. However intractable, the issues were highly negotiable.[50]

Dulles gradually worked through the agenda until by the end of the morning only the testing item remained. To Strauss' surprise, Quarles left the room at that point, leaving him as the lone spokesman for continued nuclear testing within the Administration. Strauss described Stassen's proposal as a major departure from the policy established by the President in November 1956, and reaffirmed by the Chief Executive prior to the London talks. Stassen's proposal was wrong, Strauss argued, because it reversed the proper sequence of events by suspending testing before an inspection system was in place. This was the basic, and fatal, flaw in Stassen's plan. There were other problems, to be sure, and Strauss insisted that the United States could not negotiate with the Soviet Union except from a position of strength. Although the United States could maintain indefinitely numerical superiority in nuclear weapons over the Russians, in time the Soviets would obtain sufficient numbers to render the American "lead" relatively unimportant. Strauss believed that the United States could maintain real "qualitative" superiority, but not without testing. Through their own development programs and espionage, the Soviets constantly strove to match American weapon technology. "To maintain our position of strength," Strauss pleaded with Eisenhower, "we must continue to improve. We cannot continue to improve with our laboratories shrunken and weakened, and we cannot put improvements into stockpiled weapons without tests to see that the improvements are practical."[51]

To Strauss' amazement, Dulles countered with a suggestion which the Secretary of State attributed to the absent Quarles. The rebuttal was, in fact,

basically Strauss' own fall-back position which he had confided to Libby the previous day: the United States would suspend testing for twelve months, after which tests would be resumed if no inspection agreement had been signed. Future tests would be announced through the United Nations, and would include limited attendance as had been suggested at the recent Bermuda Conference. Libby had subsequently lunched with Quarles with whom he shared Strauss' strategy, and now the chairman sat helpless, apparently "sunk by my own guns." Bail as he might, Strauss could not convince Eisenhower that the weapon laboratories were in jeopardy, or that plans to develop small "clean" bombs for air defense would falter.

When the debate was virtually over, Quarles returned to the meeting, but did not participate in the discussion. According to Strauss, no one spoke up from the Defense side of the table, although after the meeting adjourned both Radford and Loper privately expressed their distress. Thus the meeting ended with the President endorsing Strauss' fall-back position on Stassen's proposal to end nuclear testing as presented by Dulles but attributed to Quarles. Again Eisenhower reaffirmed his willingness to make real concessions to end the arms race. At the same time, he expressed confidence that Strauss and the Commission would find a way to keep the laboratories strong and intact.

LONDON CONFERENCE RECONVENES

As the Joint Committee launched its public hearings on the effects of fallout, Stassen returned to London with fresh instructions and renewed determination to secure a disarmament agreement with the Soviet Union. On May 28 and 30, he briefed British officials on the new policy, concentrating almost exclusively on provisions relating to nuclear arms control. Although Stassen did not outline the American position for the British in writing, he summarized the main points relating to testing, first use of nuclear weapons, transferring special nuclear material to international stockpiles,[52] and cutting off the production of weapon-grade nuclear material.

Inexplicably, on the following day, May 31, despite instructions to the contrary, Stassen gave Zorin an "informal memorandum" which delineated the new American disarmament policy. Herter had warned Stassen not to engage in serious negotiations until the President had approved the policy statement in which all parties concurred. Stassen's incredible behavior can be explained by his eagerness "to do something" to end the arms race as directed by the President, and perhaps by his political ambitions. Actually, he had prepared two documents: the first reflecting his understanding of the meeting on May 25, and the second his "informal" interpretation of the new American position for Zorin.[53] Although he had not compromised an official document, his friendly memorandum to Zorin seemed to commit NATO allies to American policy without prior consultation, while at the same time actually misrepresenting the United States' new position.

Consternation was palpable on both sides of the Atlantic, although for very different reasons. In Europe allied leaders were incensed because Stassen, without their consent, had proposed opening most of western Europe to Soviet aerial inspection. Earlier Dulles had assured West German Chancellor Adenauer that a European zone would not be included in an Open Skies agreement during the first stage of disarmament, and certainly would not be established without the consent of America's European allies. Open Skies, had been a relatively minor issue at the meeting on May 25. Now Stassen had not only aggravated the NATO allies, but he seemed to commit the Eisenhower Administration to policies not agreed to in Washington and to which the military and the Commission were

strongly opposed. Dulles, Strauss, and others met to see how they could repair the damage Stassen had caused.[54]

For the Commission, Stassen's faux pas was fortuitous because it allowed Strauss to reopen the testing issue while impugning Stassen's reliability as a disarmament negotiator. According to Strauss, Stassen had oversimplified, glossed over, and outright misrepresented American policy. Although Strauss conceded that Stassen's memoranda were generally in accord with the White House agreements, he was distressed that Stassen had played down the inspection system as "pro forma." For Strauss, safeguards remained the chief stumbling block to an arms control agreement, not the relatively simple matter that Stassen implied. Angered by Stassen's behavior, Dulles seemed to agree with Strauss' assessment when he privately criticized Stassen for observing "the letter of the law," but skewing it to create "a different impression."[55]

Once again, the famous Eisenhower temper roared within the safe confines of the White House. Furious, the President promised that Dulles would take the necessary steps to correct any misunderstandings. Eisenhower knew the wisdom of not overreacting, but at the same time, he was determined to put both Zorin and Stassen on notice that the United States envoy had acted without sanction. Accepting Dulles' advice, Eisenhower bowed to a cooler approach in dealing with Stassen, the Russians, and America's NATO partners.[56]

While Dulles quietly mollified anxious diplomats and government officials at home and abroad, Eisenhower tried to clarify his arms limitation policy in a press conference on June 5. The continuing Joint Committee hearings had intensified public concerns about fallout. In response, Eisenhower told reporters he "would like to allay all anxiety in the world by a total and complete ban of all testing, based upon total disarmament . . . ." At the same time, he asserted the importance of testing to develop "clean" weapons. Clearly, Strauss had not labored in vain. A test ban could only be part of the first step towards disarmament, according to the President, if it were accompanied by an acceptable inspection system.[57]

In London, Stassen assured reporters that the United States had not yet presented official proposals to the Russians. All discussions had been "entirely preliminary," he asserted. Then, almost offhandedly, he mentioned that he intended to return to the United States to attend his son's graduation from the University of Virginia on Monday, June 10. The trip home would be strictly personal "with no official business," Stassen announced. He did not tell the press, however, that on orders from Dulles to withdraw his "informal memorandum," he had asked Zorin to return the paper. On June 8 Zorin further complicated matters by handing Stassen a formal Soviet reply to the as-yet-unofficial American proposals.[58]

STASSEN REPRIMANDED

Stassen spent a busy "holiday" in Washington, after celebrating his son's graduation in Charlottesville. Both to Dulles and Herter, Stassen insisted that he had neither violated his instructions nor slighted NATO allies. On the contrary, Stassen countered, he had consulted with the Western delegations on "all points" prior to his meeting with Zorin. The trouble was that the Russians resented the fact that NATO partners which were not represented at the disarmament talks, were nonetheless privy to American policy. Impatient, Zorin had complained to Stassen that he was placed in an impossible position by being the last to learn about the new American proposals. When the Russian had intimated that he might be forced to break off negotiations, Stassen decided to brief his Soviet counterpart informally. Although he had committed no impropriety, he admitted he had angered the British.[59]

Stassen's explanation, however, hardly settled the matter. Zorin reportedly had cautioned that any withdrawal of Stassen's paper "would be detrimental to negotiations." Like a tar-baby, the Americans appeared to be stuck with Stassen's paper whether they liked it or not. As Dulles complained to Senator Knowland, there was even some danger that the Russians might make a commitment which would throw into the Senate's lap an inadequate arms limitation treaty to ratify or reject.[60]

On June 11, with Herter as his witness, Dulles severely reprimanded Stassen for his conduct in London. Acknowledging Stassen's good intentions, Dulles expressed his "shock" and worry over Stassen's apparent insensitivity to diplomatic protocols. Dulles demanded that Stassen refrain from circulating unauthorized documents "without advice and consent from the Department." As a further measure, Dulles informed Stassen that he was appointing a foreign service officer as Stassen's deputy with special responsibilities to provide liaison between NATO and the State Department. The following day Dulles sent almost identical assurances to Macmillan and Adenauer: "that with Presidential authority I have had a very thorough review of disarmament proposals with Governor Stassen and that the President and I feel certain that there will be no repetition of unauthorized procedures. . . ."[61]

Despite these assurances, Dulles did not intend to give America's NATO partners a veto over United States' disarmament policy. Unless disarmament progress was made soon, Dulles feared that several nations, including the United States, might begin unilateral disarmament under the pressures of public opinion and the high costs of military expenditures. He realized that the development of nuclear weapons was in its infancy and that the crude weapons then available were a deterrent only because they were weapons of mass destruction. With the development of more sophisticated tactical nuclear weapons, however, Dulles believed the eventual use of nuclear weapons in war would become inevitable. Ironically, as the era of massive retaliation ended, the likelihood of nuclear warfare increased, especially as "fourth" powers were able to obtain cheaper, smaller weapons. Dulles could see no way out of this dilemma. Gradually, NATO would become obsolete as the credibility of America's atomic shield diminished and France, and possibly others, obtained nuclear capability. For that reason, Dulles did not believe that NATO sensitivity over European inspection zones should be allowed to derail the disarmament talks.[62]

THE SOVIET RESPONSE

Stassen's first task on returning to London in June was to build support among America's NATO allies for the United States' position on the first phase of disarmament. These NATO consultations, including deliberations of the Western Four and separate bilateral discussions between the Americans and the British, French, and Canadians, would build consensus on the issues of aerial inspection, test ban, "cut-off" of the production of special nuclear materials for weapons, and reduction of conventional armaments.[63]

No sooner had Stassen returned to London when, on June 14, Zorin announced that the Soviet Union was willing to accept a nuclear test ban with international control and supervision. Mindful that the Western powers would not agree to an unconditional test ban, Zorin proposed a temporary moratorium for a period of two or three years. Most significantly, the Soviet Government, with a view to removing the major obstacle to a test moratorium agreement, proposed that an international inspection commission establish control posts in the United States, the United Kingdom, the Soviet Union, and the Pacific test area.[64]

The Russians had made an important concession, and the Allies immediately recognized it. For the first time in the history of postwar disarmament talks, the Soviet Union was ready to consider establishing inspection posts within the Russian heartland. One of Stassen's foreign policy objectives to breach the iron curtain now actually seemed obtainable.

At his June 19 news conference the President was clearly buoyed up by the prospects of a test moratorium. "I would be perfectly delighted," he told reporters, "to make some satisfactory arrangement for temporary suspension of tests while we could determine whether we couldn't make some agreements that would allow it to be a permanent arrangement." The President also reiterated the importance of reliable safeguards, but noted that a test ban was not necessarily linked to an agreement on controlling the production of special nuclear material. Assuring the press that he was "intimately acquainted" with the American position presented by Stassen in London, he declined further detailed comment except to confirm his belief that the disarmament conference was not merely a sounding board for propaganda, but held out real possibilities for general agreement.[65]

THE COMMISSION'S "CLEAN BOMB" INITIATIVE

As both a justification for further testing and as an answer to the international concern over fallout, the Atomic Energy Commission had been touting the "clean bomb" since the 1956 elections. Shortly after he returned from the Enewetak Proving Grounds in July 1956, Strauss had announced that the Commission had discovered new possibilities for perfecting nuclear weapons which concentrated maximum destruction on targets while reducing widespread fallout. Just weeks before his reelection, Eisenhower had reported that the Redwing tests had increased the United States' ability "to harness and discipline our weapons more precisely and effectively...." As if to endorse the need for continued testing, the President concluded that "further progress along this line is confidently expected."[66]

When the Commission again boasted of progress in its "clean bomb program" on May 29, 1957, the Joint Committee called foul. Coming just four days after the President had approved his new disarmament policy, and in the midst of the Joint Committee's fallout hearings, the Commission's announcement smelled of politics. With Senator Anderson's concurrence, Congressman Holified charged that the Commission was misleading both the Joint Committee and the American people on the potential "cleanliness" of large, multimegaton thermonuclear weapons.[67]

Almost three thousand miles away in Livermore, California, Senator Henry Jackson spent Memorial Day visiting with Ernest Lawrence, Edward Teller, and the laboratory staff. Among other issues, Jackson was particularly interested in the future production requirements for plutonium and tritium at Hanford and Savannah River. His questions naturally led to discussions about the development of weapon systems, the necessity for testing, and the consequences of a test moratorium for the work at the weapon laboratories. As a result of their meeting, Jackson invited the scientists to share their views on production requirements with the Joint Committee's Subcommittee on Military Applications, which the Senator chaired.

At the hearings on June 20, Jackson introduced Lawrence, Teller, and Mark Mills from the Livermore Laboratory. Recalling his recent trip to California, Jackson reported that he "was particularly impressed with the progress that they were making in low-yield weapons, the possibility of making them smaller, the possibility of making them cleaner," and as he noted, ". . . the gleam in the scientists' eye of making them almost like Ivory Soap, [but] not quite."

In their testimony the California scientists presented a simple, but powerful argument for increasing plutonium production and continuing testing. According to the scientists, plutonium weapons could be made smaller, cheaper, and more versatile than uranium weapons; and coincidentally, fusion weapons with very low fission yield would be cleaner than existing hydrogen weapons. As Teller explained it, the United States knew how to build "dirty" bombs of almost unlimited size, but smaller weapons using plutonium still remained to be perfected. For Lawrence the moral choice was stark and unambiguous. "If we stop testing," he warned the committee, "well, God forbid. . . we will have to use weapons that will kill 50 million people that need not have been killed." Somehow, Lawrence said, the American people had to realize the "crime" that would be committed if the United States had to use dirty bombs in war. No one described "clean bombs" as humane, but Lawrence, Teller, and Mills were moved by no less a moral imperative than Schweitzer or Pauling. Because they believed the fallout hazards from testing were negligible, they thought it would be "wrong," "misguided," and "foolish" to ban the development of weapons which might spare countless millions from nuclear holocaust.[68]

The next day, June 21, Lawrence, Teller, and Mills shared the same message with the full Joint Committee. Again Lawrence repeated his assertion that "it would be a crime against the people" to stop testing. Graphically, Teller described how an attack on Vladivostock might result in the death of thousands of Japanese as fallout drifted eastward. It was imperative for the United States to develop nuclear weapons which limited their destruction to the immediate area of the target. "Dirty" weapons, like poison gas, could contaminate friends and foes alike. In Teller's view, the United States would enjoy an enormous military and psychological advantage in a limited war if it could employ "clean" weapons while the Russians had no choice but to contaminate innocent populations with fallout from "dirty" bombs. Furthermore, the United States would be placed in an impossible position should the Soviets secretly develop their own "clean" weapons during a test ban while the United States was handcuffed from doing so by an international treaty.

Alarmed, Senators Bricker and Pastore wanted to know whether the President, Strauss, or Stassen knew of the imperatives to develop "clean" weapons. Bricker was haunted by the belief that the recent Joint Committee fallout hearings simply fed Russian propaganda by focusing almost exclusively on the potential dangers of radioactive fallout. The President should know, and the Joint Committee's report on fallout should reflect, Bricker said, that continued testing was necessary to perfect the clean bomb, which would "do more to preserve the peace of the world than anything we could do."

Teller next described various ways by which the Soviet Union could hide underground and upper atmospheric testing during a test ban. He explained how the Russians could muffle underground megaton tests so as to confuse seismic monitoring. Again the Joint Committee wanted to know whether the Administration was aware of this information. Lawrence was embarrassed because as an advisor to Stassen he had a clear obligation to keep the Administration adequately informed of technical and scientific impediments to a test ban. Instead, Lawrence and his colleagues were actually undermining congressional confidence in the London negotiations. As diplomatically as possible, Teller explained that Stassen had been briefed on the general possibilities of hiding nuclear explosions, but he did not think that Stassen had heard of the most recent methods. How could he when Paul Foster, representing the Commission at the hearing, admitted that the Commission had learned only the day before about the possibility of an elaborate "clandestine subterranean explosion?"[69]

The Joint Committee members were shocked. On the one hand, everything about which Lawrence, Teller, and Mills had testified pointed in the direction of continuing nuclear testing. On the other hand, the reports from London all indicated that Stassen was moving in the opposite direction. Although the committee rejected the idea of recalling Stassen from London to testify, Congressman Cole by telephone personally arranged for the Californians to see the President.

Strauss, Lawrence, Teller, and Mills met with Eisenhower for forty minutes on June 24. For the third time that week, Lawrence repeated his litany that the United States' failure to develop "clean" weapons "could truly be a 'crime against humanity.'" On cue, Teller reviewed the arguments for developing small, tactical fusion weapons, including the psychological and propaganda onus of not producing them. Lawrence proposed inviting a United Nations team to the United States tests to verify that the Americans were testing "clean" weapons, while Teller outlined how nuclear explosions could actually be used for peaceful purposes.

In contrast to the Joint Committee's reaction, Eisenhower remained calm, albeit interested in the briefing. Tactfully, he agreed that no one could oppose the development program his visitors had outlined. Nevertheless, he reminded them of the mounting worldwide debate over testing. Grimly, Eisenhower lectured the nuclear scientists that the United States could not "permit itself to be 'crucified on a cross of atoms'. . . ." Furthermore, he emphasized that the test ban proposals had been offered in the context of stopping war, and were, after all, part of the disarmament package. When Mills and Teller tried to counter that a nuclear test ban could not be policed with certainty, Eisenhower responded that testing had not only fueled intense Soviet propaganda, but also had actually divided American public opinion. When Teller tried to discredit Pauling's open letter by noting how few scientists from the Berkeley campus had actually signed the statement, Eisenhower conceded that while Pauling might be wrong, so many people were reading "fearsome and horrible" reports about fallout that they were having a substantial effect. Perhaps he could say something in his next news conference to clarify the matter by explaining that the United States wanted to continue testing principally "to clean up weapons and thus protect civilians in event of war."70

As the scientists were about to leave, Eisenhower wryly suggested that in the long run the United States might want "the other fellow" to have clean weapons too -- and perhaps it would be desirable for Americans to share their techniques with the Russians. The scientists were dumbfounded by this remark. To the President, and later to Goodpaster just in case Eisenhower had not gotten the point, the visitors stressed that American weapons incorporated technical advances that the United States would not want to give to the Soviets. Teller again raised the ugly possibility that the Russians might secretly perfect a clean bomb, as well as clean, peaceful explosives while the United States had no options but dirty weapons. Teller also noted, parenthetically, that it was comparatively easy to contaminate clean weapons with "additives."71

Lawrence, Teller, and Mills profoundly impressed both Eisenhower and the White House staff and temporarily succeeded in shaking the President's commitment to a nuclear test ban. Following the meeting, Eisenhower complained to Dulles that he had received suggestions from so many people that he was confused. He was especially upset that Strauss and his friends made "it look like a crime to ban tests." As Eisenhower recalled their argument, the most promising peaceful uses of atomic science ironically depended upon developing (and testing) a clean weapon. For the President there could not have been a more painful dilemma than to have the future dependent on still another round of

weapon development. Dulles admitted that the United States could not agree to a test ban independent of sound inspection requirements and other disarmament agreements.[72]

Writing to Strauss, Bromley Smith, Cutler's assistant, summarized the disturbing implications of what the scientists had told the President. Smith acknowledged that the scientists not only had a professional interest in testing, but also perhaps "an unconscious desire to reduce the horror of nuclear weapons which they are responsible in large part for creating." Yet, whatever the scientists' motives, they had convinced Smith that without reliable policing, the risks of a test ban were too high. As he reported to Strauss, Smith now strongly urged Cutler to give Strauss another chance to present the case against a test ban to the President.[73]

Although Eisenhower understood the implications of the scientists' briefing, he was unwilling to abandon hope for success in the disarmament talks. As promised, at news conferences on June 26 and July 3 Eisenhower expressed his interest in developing clean bombs and peaceful nuclear explosives, but he did not preclude a test ban, as the scientists had wanted. Indeed, the President spoke as if clean bombs whose fallout had been reduced by 96 percent were an accomplished fact. Furthermore, he indicated that within four or five years, with adequate testing, the United States could develop an "absolutely clean bomb." If the President worried the scientists because he slightly exaggerated even their most optimistic claims, he must have satisfied them by adding his hope that the Soviets would also "learn how to use clean bombs."[74]

In New York, David Lilienthal could only shake his head in disgust over the newspaper reports of Lawrence, Teller, and Strauss meeting with the President to promote clean bombs. "The irony of this is so grotesque," he confided to his journal, "it is rather charming." Lilienthal recalled that the same trio had once been so certain that the super H-bomb, "big as all hell," would be the salvation of the country. Ruefully, he also noted that it had been people like himself, and Oppenheimer he might have added, whose patriotism or good sense had been questioned because they harbored doubts about the development of the thermonuclear bomb. Now with the weapon laboratories threatened by disarmament, the super-bomb scientists stumped for small, clean tactical weapons not too different from what Oppenheimer had advocated just four years previously. In sum, Lilienthal characterized the promoters of the clean bomb as pathetic, transparent, and greedy.[75]

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CHAPTER 17
TOWARD A NUCLEAR TEST MORATORIUM

In the summer of 1957, the Atomic Energy Commissioners realized that nuclear testing and fallout continued to pose a serious public relations problem. With the President already committed to stopping tests if at all possible, mounting international anxiety over nuclear weapons and fallout only strengthened Eisenhower's resolve to negotiate a verifiable test ban with the Soviet Union. Although Eisenhower did not achieve his goal in 1957, the Commission thereafter had to cope with increasing skepticism from the White House about the need for large numbers of atmospheric tests, and within the scientific community about the safety of those tests. The general public, meanwhile, clearly favored a test cessation of some sort. While the number of persons who called for a unilateral halt to testing was small, by mid-summer 64 percent of Americans favored a multilateral agreement.[1] Public support for a multilateral test ban would gradually decline as negotiations bogged down, but a majority of Americans generally continued to want a test ban of some sort.

THE "PUBLIC RELATIONS PROBLEM"

By and large, the Commission and the Joint Committee on Atomic Energy were satisfied with the outcome of the fallout hearings which had concluded on June 7. Shortly after Libby testified in June, he privately briefed the State Department staff on the effects and significance of radioactive fallout, especially from testing. Commendably, Libby's briefing was consistent with his public testimony. Although he conceded that the Commissioners had learned a great deal about fallout since 1954, they still believed "that the risks involved in testing [were] infinitesimal."[2] At a Blair House party, James Ramey had confided in Gerard Smith that the Joint Committee was especially pleased at the amount of new information which had been forthcoming at the hearings. Yet Ramey conceded "that a majority of the reporters [were] in way over their heads," resulting in a great deal of simplified or distorted reporting.[3]

Dwight A. Ink, a member of the general manager's staff, succinctly outlined the public relations problem. In May 1957, the Commission had received almost six hundred letters from people concerned about the hazards of testing. In addition, Ink noted that criticism in the press, and from abroad, had increased dramatically. Against this background the fallout hearings had progressed well, with the Commission presenting its testimony calmly and effectively -- for the benefit of the Congressmen. Nevertheless, headlines featuring the hearings had underscored the dangers of fallout or had emphasized the disagreements among the scientists. Because public opinion would be shaped by the press reports rather than the hearing transcript, Ink predicted that the hearings would prove to be of little help in educating the public despite the excellence of the testimony. Although Ink tried to be optimistic, it was impossible to escape the conclusion that a defensive Commission, facing the divided opinion of the scientific community and the momentum of the disarmament talks, would find it almost impossible to mount a successful public relations campaign.[4]

The advisory committee on biology and medicine generally agreed with Ink's assessment. In a special meeting with the committee on June 18, 1957, Strauss acknowledged that "the climate was undesirable and unfortunate." Strauss reflected the Commission's consensus that fallout was not a matter of health or science but rather a public relations problem. Indeed, from Strauss' perspective, the Commission could not have avoided its predicament, but had been trapped when in February 1955 the State Department had forced it to delay reporting the results of the Castle/Bravo fallout study. Strauss also wondered

why the National Academy of Sciences' report on fallout had been "brushed aside" by so many people, including prominent scientists. He considered Albert Schweitzer's appeal as "a body blow to the testing program."[5]

Almost literally, the Commission saw itself on the ropes, the defensive victim, not of sloppy testing or bad science, but of a deepening public relations fiasco. Strauss continued to believe that Americans would support the Commission's need to test if only the public could receive a full and accurate assessment of radiation hazards. Believing that an active testing program significantly helped to deter Soviet aggression, Strauss would have balanced the radiation exposure risks from testing against the devastation which would result from atomic war. In fact, American insistence on careful testing created difficulties for the United States in the disarmament talks. If testing and weapon production were halted, Strauss argued, the Russians would gain a distinct advantage because of their willingness to produce weapons without the extensive testing required by American engineering standards.

The argument that weapon testing and development actually were deterrents to nuclear war would be heard over and over again.[6] Congressman Cole, for example, also believed it was essential for the United States to develop "clean" tactical nuclear weapons to be used in limited wars. He did not think that the tactical use of nuclear weapons would inevitably lead to all-out, spasm nuclear war between the super powers. Cole granted that there was widespread public misconception that nuclear weapons were "wanton, indiscriminate and inhumane." On the contrary, he believed that nuclear weapons could be as precise, "humane," and limited in their use as any other weapon. The Russians, however, had constantly fanned the "flames of misconception" regarding the ruthlessness of atomic weapons. With its great manpower advantage it was in Russia's interest to outlaw nuclear tests and weapons through a campaign of fear, deceit, and propaganda. To Cole's dismay, the Soviets had been "astonishingly" successful.[7]

Cole's implication that advocates of a test ban were communist dupes, or worse, only reflected Eisenhower's comments at his June 5 press conference. Although the President later tried to soften his unfortunate remarks that the anti-testing protests almost looked like "an organized affair," Congressman Francis Walter of Pennsylvania underscored Linus Pauling's association with communist-front groups. Furthermore, Representative Lawrence H. Smith of Wisconsin accused Norman Cousins of being a communist dupe by urging Schweitzer to join the test ban movement. Cousins, in turn, scolded Eisenhower for his lack of generosity, noting that never before had Cousins known the President to impugn the good faith, integrity, or intelligence, let alone loyalty, of those who held views different from the Administration. Strauss wanted Eisenhower to send Cousins a long, blistering reply citing an article in the U.S. News and World Report which described how Pauling had organized his petition. Eisenhower did send Cousins the article, but in a tempered single-page note he merely assured the editor of the Saturday Review that he would continue pursuit of the peaceful atom, but not at the expense of exposing Americans to unacceptable military risks.[8]

ON THE BEACH

During the first two weeks of July, as administration officials watched one of their most pessimistic nuclear war scenarios unfold in Operation Alert exercises at the Atomic Energy Commission, two dozen concerned scientists gathered at the summer home of industrialist Cyrus Eaton in Pugwash, Nova Scotia, to discuss ways of ending the nuclear arms race. Meeting from July 6 to 11, this first international Pugwash conference on science and world affairs attracted scientists from ten nations including the Soviet Union. The

conference prepared a report which, Linus Pauling noted, "covered the hazards arising from the use of atomic energy in peace and war, the problem of the control of nuclear weapons, and the social responsibility of scientists." As Pauling proudly reported, the three Soviet scientists at Pugwash signed the report, and returning to Russia obtained the endorsement of 198 members of the Academy of Sciences and other Soviet academics. The Pugwash conference adjourned with an appeal for "the abolition of war and the threat of war hanging over mankind."[9]

Commission officials involved in Operation Alert at the Emergency Relocation Center, of course, were oblivious to the appeals of the Pugwash conference, but the secret results of the government's third annual disaster exercise were hardly less frightening than the published nuclear war scenarios which Americans would read in the summer of 1957. Most graphic was Nevil Shute's apocalyptic novel On the Beach, in which the entire world was laid waste by radioactive fallout. In Shute's fantastic book a spasm nuclear war between the great powers unleashed thousands of "cobalt" bombs which quickly rendered the northern hemisphere uninhabitable, and slowly contaminated the rest of the world. Australians estimated that they had only nine months to live. Shute's hero was an American submarine commander who found temporary refuge in Australia. Drawn by the love of an Australian woman, but determined to verify the fate of his wife and family, the commander sailed north, the only active remnant of the once powerful American Navy. Reconnoitering safely underwater where his crew escaped the effects of the deadly fallout, the commander cruised through the formerly lush Puget Sound to Seattle, which he found a lifeless desert. Ultimately, commander and crew had no choice but to return to Australia to await their fate.

One critic found Shute's novel banal, and others noted that it stretched scientific and military credulity to the point of science fiction. Nevertheless, the book became a best seller, and, predictably, a popular movie. The popularity of On the Beach indicated that the American public now understood the strategic implications of the Castle/Bravo test.[10] Blast and heat from thermonuclear bombs could be horribly devastating, but even more fearsome was the threat from widespread fallout which, if unlikely to contaminate the entire world, might poison millions of square miles and kill additional millions of people.

EFFECTS OF NUCLEAR WEAPONS

Although repeatedly accused of being too secretive and overly optimistic, the Commission published its own vision of nuclear war in the summer of 1957. If not as dramatic as On the Beach, Samuel Glasstone's The Effects of Nuclear Weapons was just as vivid and infinitely more accurate. In an earlier edition, The Effects of Atomic Weapons, published in 1950, Glasstone described the destruction caused by a single "nominal" twenty-kiloton bomb. In his update, Glasstone not only changed the title to reflect the thermonuclear age, but also noted that it was "no longer possible to describe the effects in terms of a nominal bomb." Rather, Glasstone outlined the blast, heat, and radiation effects of twenty-megaton thermonuclear bombs, which were a thousand times more powerful than the bombs dropped on Japan in World War II. With the expectation that the handbook would be used by civil defense personnel, the government released the Effects of Nuclear Weapons just prior to launching Operation Alert.[11]

The Effects of Nuclear Weapons told its own grim story. Wood frame houses less than twelve miles from ground zero would be completely destroyed by a twenty-megaton blast. Houses as far as twenty miles away could have windows and

doors blown in. Within six miles of ground zero, most multistory buildings would become rubble. Planes parked twelve miles away would be tossed about like toys. Within ten miles forests would be denuded, broken, blown down, or uprooted. In human terms, persons caught outside could suffer third-degree burns thirty miles away, while some individuals fifty miles away would receive first-degree burns.[12]

Reviewers noted that Glasstone did not mention "clean" weapons. Nevertheless, he included abundant information on radiation effects and fallout. Observing that a radiation dose of 700 roentgens spread over 36 hours would probably prove fatal, Glasstone, using fallout data from the Castle/Bravo shot, calculated the dosages persons would receive after an attack if they were caught in the open without shelter for a day and a half. A fallout plume nearly twenty miles wide at its base, and 140 miles long would seriously threaten the lives of all persons who remained in the area unprotected. Two hundred twenty miles downwind, deaths due to radiation would be negligible, although numerous victims would be temporarily incapacitated with radiation sickness. Soberly, Glasstone observed that true radiological warfare, although theoretically possible, was impractical with the old fission bombs. But after the development of thermonuclear bombs with high fission yields radiological warfare became "an automatic extension of the offensive use of nuclear weapons of high yield." Almost as if he anticipated On the Beach, Glasstone included a new chapter on worldwide fallout and long-term residual radiation. Glasstone's analysis was no more optimistic than an earlier study, Radiation: What It Is and How It Effects You, by Jack Schubert and Ralph Lapp.[13]

KISSINGER ON NUCLEAR WAR

Henry Kissinger's book on Nuclear Weapons and Foreign Policy was also published in time to be included on 1957's summer reading list. Although not as graphic as Shute's On the Beach or Glasstone's The Effects of Nuclear Weapons, Kissinger's portrayal of nuclear war and its social, political, and economic consequences was just as shocking. Under the sponsorship of the Council on Foreign Relations, Kissinger had developed his theories roughly concurrently with the Eisenhower Administration's reassessment of nuclear strategy following the Castle/Bravo test. Drawing from nuclear war theorists, including Warren Amster, Bernard Brodie, William Kaufmann, Basil Liddell Hart, and Robert Osgood, Kissinger stated boldly what insiders and professionals already knew: the United States could not rely on the strategy of "massive retaliation" when its potential enemy also possessed thermonuclear weapons.[14] He analyzed the weakness of America's defense against conventional and thermonuclear attack, and repeatedly stressed the need for a credible nuclear deterrent to contain Soviet expansionism. Kissinger believed the Russians would constantly nibble away at the West, first aggressively, then backing away in conciliation, but they always would be ambiguous. At no time would the United States be provoked into an all-out nuclear attack. Rather, the Soviet Union would confront western powers with limited adventures, none of which would justify plunging the world into nuclear holocaust.

With Brodie, Osgood, and others, Kissinger struggled to develop a doctrine of limited nuclear war which would enable the United States to respond more flexibly to Soviet aggression in the nuclear age. Yet "limited war" and "limited nuclear war" could be easily confused. In the summer of 1957, no scenario stopped short of all-out nuclear war once nuclear weapons were unleashed. Although the Commission talked seriously of "clean" bombs and "tactical" weapons, nuclear weapons, however they were designated, could not be considered just another weapon in the American arsenal. Perhaps the terms

"clean" and "tactical" reflected hopes to relate nuclear weapons to traditional warfare. Conventional wisdom held, nonetheless, that once introduced into battle, the use of nuclear weapons could not be restricted.[15]

HOLIFIELD AND FALLOUT

From the Commission's perspective the success of the fallout hearings chaired by Congressman Chet Holifield was measured by the more than 2,000 pages of testimony recorded by the Joint Committee. The Commission had been able to present its fallout data along with a plea for increased support for Project Sunshine without creating undue alarm or criticism from the press. The Commission did not escape completely unscathed, however.

Perhaps the Commission's most outspoken critic over fallout at this time was Holifield himself. In his report to Congress, Holifield complained that the Joint Committee literally had to "squeeze the [fallout] information out of the Agency." Had it not been for Congressional hearings, Holifield argued, the Commission would withhold information important to the public. Even when the Commission did release fallout information on its own initiative, according to Holifield, the data were so technical or piecemeal that reporters and layman alike had difficulty understanding its importance.[16]

More importantly, Holifield charged that the Commission had developed a "party line" on the hazards of fallout from nuclear testing -- "play it down." Despite the Commission's responsibility to keep the public informed, it was not only tardy in releasing information, but worse, according to Holifield, the Commission had selectively used information to support the Administration's political positions. Dredging up the conflict between Strauss' role as special advisor to the President and chairman of the Commission, Dixon-Yates, and the 1956 presidential campaign, Holifield linked these issues with the Commission's supposed muzzling of its scientists over the test ban question.

As Senator Anderson had previously questioned the Commission's role of both promoter and regulator of the nuclear power industry, Holifield saw a "conflict of interests" on the weapon side. "Is it prudent," he questioned rhetorically, "to ask the same agency to both develop bombs and evaluate the risks of fallout?" Later, writing in the Bulletin of the Atomic Scientists, Holifield supported greater research efforts on radioactive fallout and its effects on human health, but only under the auspices of the National Academy of Science.[17]

THE ASSESSMENT OF SCIENTISTS

Holifield's charges that fallout information could be pried out of the Commission only by Congressional investigation was especially irksome to Strauss, who felt he had been double-crossed by the Congressman. For the past year and a half, the Commission had cooperated with a United Nations scientific committee on radiation which had been proposed by the United States. The Americans' purpose, to be sure, was to allay international fear of radioactive fallout through the international scientific committee; but there was also a sincere interest in determining the dimension of the danger. Shields Warren, Austin Brues, and Merril Eisenbud were the United States delegates. In the autumn of 1956, Warren reported that the United Nations panel had made considerable progress in collecting and analyzing fallout data, but nevertheless depended heavily on the United States and the United Kingdom for scientific information. Warren concluded with some satisfaction that "the willingness of the United States to share its information and, indeed, to assist other nations in collecting and analyzing fallout material, has certainly strengthened its position regarding the radiation problem."[18]

A year later, in 1957, the United States had submitted over thirty reports to the United Nations scientific committee, including papers on fallout, natural background radiation, genetic effects, occupational radiation hazards, generalized radio-biological effects, and waste disposal. The United States' first contribution had been the study prepared by the National Academy of Sciences -- National Research Council, "The Biological Effects of Atomic Radiation." The Commission and the State Department considered the government's most recent contribution to be its testimony during the fallout hearings, which "provided the most exhaustive supply of data that has yet been compiled on this subject." In contrast to Holifield, the Administration viewed the Joint Committee hearings as part of the United States' continuing effort to inform the public and scientists throughout the world of the effects of fallout and radiation hazards.[19]

In response to the Joint Committee's fallout hearings and the work of the United Nations scientific committee, the Commission's advisory committee on biology and medicine reviewed the entire program of the division of biology and medicine and found it restricted, underfunded, and understaffed. In addition, through the summer and into fall the advisory committee prepared a "Statement on Radioactive Fallout" for the Commission. The advisory committee noted that since 1954 strontium-90 content of the soil had markedly increased while concentrations in milk had "increased steadily with time." Even if weapon tests were stopped, fallout would continue for a considerable period. Unfortunately, with continued testing, long-range estimates were at best only "intelligent guesses." The advisory committee also estimated that testing would contribute to a small increase in leukemia deaths, and would cause some genetic damage in the world's population, which in the course of time could be "large in absolute terms."[20]

Although the members of the advisory committee on biology and medicine admitted that fallout from testing could be a problem, they nevertheless continued to believe that testing was necessary for national security. They urged the Commission to hold testing "to a minimum consistent with scientific and military requirements." It was unprecedented for the advisory committee publicly to request restraint from the Commission.[21]

HARDTACK REEXAMINED

In August 1957 Eisenhower met with Strauss, Smith, and Cutler to discuss forthcoming weapon tests. The President was alarmed over both the large number and excessive length of the tests scheduled for Hardtack in the spring and summer of 1958. Because of the disarmament discussions, the Commission and the military liaison committee had agreed to accelerate the testing program. Strauss told Eisenhower that he had cut in half the number of shots requested by the laboratories and the Department of Defense. Still, he agreed with the President that too many tests were scheduled. Strauss also admitted that four months -- May through August -- would seem like a long time, especially if disarmament talks were proceeding concurrently. Requirements that the weather be perfect for testing, however, dictated the lengthy schedule.[22]

The fallout issue no doubt caused Eisenhower to question the size of some of the proposed Hardtack shots as well. Strauss conceded that the Commission and the State Department saw no need to test very large weapons. The requirement to test multi-megaton weapons had come from the Department of Defense, which wanted to determine what size and yield a B-52 could carry. In response to the President's skepticism, Strauss proposed a compromise which would limit all Hardtack shots to a yield not larger than the 1954 Castle/Bravo test, a limitation which would become permanent.

Although Eisenhower granted authority to continue planning for the Hardtack tests, if limited in size and condensed in time, he expressed his frustration at having to conduct extensive tests on the one hand while professing readiness to suspend testing in a disarmament program on the other. World opinion would be skeptical of the President's good faith in view of United States' paradoxical conduct.[23]

Strauss took the President's case directly to Donald Quarles, the Deputy Secretary of Defense. Uncharacteristically, Strauss was sharply critical of the weapon program. He compared it to the faltering missile program -- too many designs, too much interservice rivalry, too much time spent on engineering refinements, and too little time spent on thinking of radically new approaches. The consequences were unhealthy and self-defeating. The laboratories were burdened with programmatic minutiae instead of original work. Scientists were so overloaded that they had little time for reflection or exploration. Before one test series was even concluded, the laboratories began planning for the next. Not only was the government spending unnecessarily large sums of money, but it was also aggravating United States and world sentiment to the extent that testing itself was endangered. Strauss admitted that the Commission was not free from criticism, but the greatest impetus for unnecessary tests came from the Department of Defense. He had assured the President that Hardtack would "not test beyond what is 'necessary,'" Strauss reported, and he left no doubt that he hoped Quarles would make an honest man of him.[24]

Ultimately, Eisenhower authorized thirty-five tests in Hardtack Phase I, which featured six "clean" designs in a variety of yields; an additional "clean" test for United Nations observation was under study. Although worldwide fallout from Hardtack would be slightly greater than from Redwing, Strauss assured Eisenhower that it would be less than half of that from Castle.[25]

LONDON REVISITED

The United States and its allies had welcomed the Soviet Union's acceptance of scientific inspection posts for fallout detection within the Russian homeland. In addition to Eisenhower's June 19, 1957, press conference which hailed the prospects of a test ban, the Allies officially acknowledged on July 2 the possibility of "a temporary suspension of nuclear testing as part of an agreement for a first step in disarmament."[26]

Despite public optimism, there remained deep skepticism both among the allies and within the Eisenhower Administration that the Soviet Union would agree to an acceptable or desirable agreement. In London, Stassen detected a concern that a test moratorium could have unfavorable results. In Washington, Dulles was especially pessimistic about the London negotiations. Acknowledging Stassen's continuing optimism to British Ambassador Sir Harold Caccia, the Secretary of State discouraged Macmillan's proposal for private disarmament discussions with Eisenhower on the grounds that the timing was poor. Both the President and Dulles believed the negotiations would require a good deal more time.[27]

Problems with Nikita Khrushchev and verification remained serious issues. During the first week of July 1957, Khrushchev emerged the victor in a Kremlin power struggle in which Malenkov, Molotov, Kaganovitch, and, ultimately, Bulganin were the losers. Khrushchev's rise to power with the full backing of the Soviet military establishment would raise questions in the Administration about the Soviets' commitment to disarmament. A few days later, Dulles told New Zealand's foreign minister, T. L. MacDonald, that he thought the London negotiations were simply a propaganda battle with little chance of success. In

spite of the Soviets' acceptance of inspections in principle, Dulles did not believe the new regime in Moscow would accept a workable system.[28]

Increasingly, the Administration felt trapped by the disarmament negotiations. By the end of July, Eisenhower wondered about the possibility of a recess in London, but Dulles responded that the talks "were in midstream and could not stop." Eisenhower's frustration was compounded by the fact that Strauss reported a steadily mounting campaign of letters and petitions addressed to the President demanding a ban on nuclear weapons and/or the cessation of weapon testing. Perhaps the best move, Eisenhower suggested, was for Dulles to go to London to take "command of the situation."[29]

As it turned out, Eisenhower's decision to send Dulles to London was shrewd. In the first place, only Dulles could shore up the allies' faltering confidence in American leadership. To be sure, Dulles' appearance again undermined Stassen, but it also enabled Dulles personally to assure the British, French, Canadians, and the NATO allies including the West Germans (who were not a party to the negotiations) that the United States would not entertain aerial and ground inspection zones unacceptable to its allies. By August 2, having pulled together a unified front, Dulles was able to present an inspection working paper on behalf of the Western Four and NATO. By further undercutting Stassen, Dulles served notice to the Soviets that the disarmament subcommittee's work in London would be fruitless. No doubt this move suited the Russians because Khrushchev apparently wanted to take disarmament questions to the summit.[30]

Returning to Washington, Dulles confirmed the importance of his mission to London. Without his presence, Dulles did not believe the United States could have obtained the concurrence of its NATO allies, especially West Germany, to the American inspection formula. Nonetheless, he confided to Strauss that he remained pessimistic that anything would come from the London negotiations, Stassen's persistent optimism notwithstanding. Dulles had no illusions that Khrushchev would ever allow mobile ground inspection teams from the West to roam freely around the Soviet Union.[31]

With the handwriting on the wall in London, it was evident to Dulles that the United States would have to revise its disarmament position by strengthening the link between a test moratorium and inspections. On the morning of August 9, the President, his son, Dulles, Gerard Smith, and Robert Cutler met to reassess the Administration's June 11 position. For a permanent test ban, the United States would continue to insist that satisfactory progress be made in negotiating inspections for testing, stockpiling, and producing special nuclear material. But Eisenhower also suggested that the United States announce its willingness to suspend tests for twenty-four months while the nuclear powers sought to solve the inspection dilemma. Should a solution not be found, testing could be resumed, or suspension might be extended beyond twenty-four months by unanimous agreement. If there were a violation of the testing suspension, of course, any party could begin testing again.[32]

Strauss joined the group for the afternoon session. On hearing the President's proposal, he protested that the best scientists would leave the Commission's laboratories if there could be no tests or experiments for two years or more. Eisenhower shrugged off his objection with the remark that the world situation was so difficult that Strauss' point was simply irrelevant. Ultimately, the President agreed to approve a twelve-month suspension of tests, with the possibility of an extension, after all parties agreed in principle to a cut-off of nuclear material production. Rebuffed by Eisenhower, Strauss pledged that the Commission would certainly support the President's decision and work for it. Not so certain about Stassen, Dulles and Gerard Smith decided not

immediately to inform "the man in London" for fear that he would prematurely compromise the new policy on testing and disarmament.[33]

On August 15, Smith briefed the Humphrey subcommittee of the Senate Foreign Relations Committee on the adjustment of the Administration's disarmament policy. Clearly, the Americans were not out to compromise with the Russians, but rather sought to quiet nervousness among the NATO allies while improving the United States' posture in the forthcoming United Nations debates. Smith explained that the Soviet Union had offered to suspend testing for two years, independent of disarmament agreements. The United States would now counter with a proposal to halt testing for twelve months, with an extension limited to twelve months if a cutoff to the production of nuclear materials were not established. To the Senators' satisfaction, Smith explained that the new policy would strengthen the United States' position in the General Assembly debates on testing, and would increase American freedom to continue testing in the future.[34]

In London, through most of August, Zorin remained calm while the American delegation consulted with its NATO allies. Word of the United States' revised position inevitably began to leak out in Paris and London. Consequently, on August 21 Eisenhower announced that the United States would be offering new "first-step" disarmament proposals, which included a two-year test moratorium "under certain conditions and safeguards," and a permanent cessation of production of fissionable materials.[35]

For the Soviets, Eisenhower's offer was apparently the last straw. On August 27, two days before the West formally presented its new proposals to the London Disarmament Conference, Zorin launched a sharp attack denouncing the West for cynical delays and dishonesty. According to Zorin the Western powers virtually had given NATO a veto over the disarmament talks. With the denigration of Stassen, it was evident to the Soviet Union that the effective usefulness of the disarmament subcommittee was at an end. Zorin angrily anticipated that the Western powers were signaling their disenchantment with the London talks. Charging that the United States had been arming NATO "under cover of fruitless disarmament talks," Zorin's intemperate remarks left little doubt that the Soviet Union also sought another forum for disarmament negotiations.

Only Stassen remained optimistic about the future of the disarmament subcommittee. Hurriedly returning to the United States, this time ostensibly to attend his son's wedding, Stassen claimed that the major powers were closer together than at any time since the end of World War II. He conceded that Zorin's remarks posed a serious obstacle to an agreement, but he thought that the Russians were preparing to make concessions which they did not want to be interpreted as weakness. The United States should not overreact to Zorin because the Russian bluster was probably only a prelude to a propaganda alternative in the event of failure to agree. Eisenhower, of course, could only express indignation at the Russians' scornful attack, while Dulles and Strauss felt some relief at Zorin's behavior. Dulles thought that perhaps the United States had already gone too far. Strauss, who wanted to avoid a test ban, hoped that when the talks seriously resumed the United States could go back to "first principles," rather than negotiate on the existing proposals.[36]

On August 29, the United States and its allies submitted a new test suspension proposal to the London Disarmament Conference as part of a comprehensive disarmament package. The proposal called for the suspension of nuclear tests for a period of twelve months provided that the conference reached agreement on the installation and maintenance of the necessary controls, including inspection posts with scientific instruments. Tests would be suspended for an additional twelve months if satisfactory progress was achieved

in the preparation of an inspection system for the cessation of the production of fissionable material for weapons purposes. When the Soviets rejected the disarmament package in early September, there was little alternative but to adjourn the conference without setting a time or place for its next session.[37]

NUCLEAR TESTING CONTINUES

Neither the Americans, the British, the French, nor the Russians were anxious for an immediate end to nuclear testing in the summer of 1957. The French had not yet tested their first weapon, and with a test ban in the offing, the other nuclear powers wanted to complete all planned tests promptly. Throughout the London conference, the United States had continued testing in Nevada. On September 19, during Operation Plumbbob, the Commission fired the Rainier shot, a 1.7-kiloton device exploded in a tunnel drilled 2,000 feet into a mountain side. Rainier produced no atmospheric radioactive fallout or venting. Edward Teller had been one of the prime movers behind this first contained underground explosion, which demonstrated that testing could be continued underground without radioactive fallout. The Soviet Union began its 1957 series of six tests, some in the megaton range, on August 22, five days before Zorin verbally blasted the Western delegations in London. That same fall, the United Kingdom conducted tests in Australia, then concluded its experiments on November 8 with a thermonuclear shot at Christmas Island. After Plumbbob, the Commission intended to resume testing in 1958 with the Pacific Hardtack series scheduled to begin in the spring.

According to one calculation, in 1957 the three nuclear powers had exploded 42 devices, compared to 19 the year before. With more American tests planned in 1958, the international climate did not appear auspicious for a test moratorium. Yet there were signs that progress had been made. The major powers recognized the terrible, and unacceptable, destructiveness of nuclear warfare. In turn, they knew that the danger of nuclear war would be reduced by controlling nuclear proliferation, and avoiding international confrontations and accidents. The alarming buildup of atmospheric radioactive fallout would have to be stopped, and then reduced. The hope was to ease the Cold War through confidence building "first steps." Despite the denigration of Stassen and the tight linkage between a test ban and other disarmament issues, the United States had given a clear signal to both the Soviet Union and its NATO allies that it was willing to negotiate on the testing issue. In turn, the Soviet Union had acknowledged the Western power's need for adequate safeguard and inspection systems. Although significant differences between the West and the East remained, the gap between the two on the test ban issue had been narrowed. Control of conventional weapons and forces aside, agreement was possible in two areas. Because of the ease of detecting large atmospheric tests, some limitation of nuclear tests seemed probable. Because of the fear of surprise attack, some combination of ground inspection and "open skies" was essential.[38]

THE DISARMAMENT GENERAL ASSEMBLY

The twelfth session of the United Nations General Assembly became known as the "Disarmament General Assembly." As the State Department noted, seldom had so many nations placed disarmament issues so high on the General Assembly's agenda. Having failed to reach an agreement in the five-power disarmament subcommittee, the United States and the Soviet Union carried their propaganda battle to the General Assembly in September 1957.

In his opening remarks on September 20, Soviet Foreign Minister Andrei Gromyko again insisted on the importance of discontinuing all nuclear testing independent of any other disarmament agreement. As a measure of its concern,

the Soviet Union would place the test ban issue before the General Assembly as a separate and independent agenda item. In Gromyko's words, it would be a "first practical step towards the main goal - the absolute and unconditional prohibition of atomic and hydrogen weapons."[39] With this statement the Soviet Union had once again revived its old cry to "ban the bomb." All along, Strauss and the other Commissioners had argued that the Soviet Union ultimately sought to dismantle NATO's atomic shield; there was all the more reason for the United States to hold fast to its own linkage between testing, cut-off, inspection, and safeguards.

Dulles checked his own General Assembly address with Eisenhower. In his speech to the United Nations on September 19, 1957, Dulles reiterated the United States' determination to stand by its recent London proposal linking a test ban with a production cutoff. Dulles wanted to imply, but not actually say, that even without an agreement with the Soviet Union, the United States was eager to develop with its allies a common position on arms control, nuclear proliferation, and test limitations, both in duration and yields. As he wrote to Macmillan the same day, "I tried to give the impression that we could, through our collective security systems, do something in the way of limitation of armament which would give us some financial relief and enable us to meet world opinion, all consistently with having collectively an adequate military establishment." Dulles evidently sought relief from both the press of public opinion and the weight of the defense budget.[40]

Stassen continued to press hard for moderation of the London proposals so that even Eisenhower began to grow weary of his disarmament advisor. Following Adenauer's success in the West German elections, Stassen urged another reassessment of the American policy and approach to disarmament, including a two-year suspension of testing without other disarmament conditions. "Informal quiet bilateral exploration of the USSR position, while keeping our Western partners advised, is the key for results," he advised Dulles. Stassen thought it desirable for Dulles to ask the Kremlin to send Zorin to the United Nations in New York so that informal discussions could be continued.[41]

Dulles was horrified. In sharp rebuttal, the Secretary of State rejected Stassen's overture. How could any consideration be given to altering a policy less than one month old, one that had been hailed by the President as "historic" and lauded by Dulles before the United Nations? Dulles contended that Stassen's ideas on testing ran counter to the positions of the Department of Defense, the Joint Chiefs of Staff, and the Chairman of the Atomic Energy Commission.[42]

The reactions of Donald A. Quarles at Defense, Nathan F. Twining, chairman of the Joint Chiefs of Staff, and Strauss were predictable. Strauss summarized it very simply: "what is being suggested is a complete abandonment of our position," and contrary to the security interests of the United States. All urged Dulles to hold fast to the August 29 London proposals. Each response was shared with Eisenhower and Nixon, who now began to give serious consideration to replacing Stassen. The problem was that any such move would only further complicate an already messy situation.[43]

American and Russian maneuvering continued at the United Nations. In addition to their proposals to ban both weapons and testing, the Soviets asked that the membership of the disarmament commission be expanded to include all members of the United Nations. For their part, the Western powers sought an endorsement of the August 29 London proposals from the General Assembly. With twenty-four sponsors, the London proposals won endorsement, but over the opposition of the Soviet bloc, and despite abstention of most Asian and African members. In turn, the disarmament commission was expanded to twenty-five members by a similar vote, after which the Soviets announced they would no

longer participate in negotiations of the commission or its subcommittee. On testing, the Soviet Union withdrew its resolution in favor of one sponsored by India. With the solid opposition of the NATO countries, however, the substitute test ban resolution was defeated. The Western powers had "won" on each of the resolutions, but did not achieve the propaganda victory sought by Dulles.[44]

SPUTNIK

On October 4, 1957, Sputnik stunned Americans. Since the dawn of the atomic age in 1945, Americans had believed that they had become preeminent in science and technology. At the 1955 Peaceful Uses Conference in Geneva, American experts had gained a healthy respect for Soviet nuclear science and technology. Nor were American leaders naive about Soviet military capability, or about the fact that the Russians were well advanced in missile development. Nonetheless the Russians' outstanding achievement during the International Geophysical Year took most Americans by surprise. When the Soviet Union followed up a month later by launching the half-ton Sputnik II, which carried a live dog, shocked Americans knew they were behind in the space race. More ominously, it was also apparent that the Soviet Union was ahead in the development of ballistic missiles capable of carrying a thermonuclear warhead.

To reassure the public, Eisenhower addressed Americans over television on November 7. Although the United States was second to none in military strength and scientific leadership, the President promised that his Administration would give high priority to government support of science and technology. To back up his pledge, Eisenhower announced that he had appointed James A. Killian, Jr., president of Massachusetts Institute of Technology, to be his special assistant for science and technology. Later, he enlarged the science advisory committee in the Office of Defense Mobilization and transferred it to the White House on December 1. The President's Science Advisory Committee, chaired by Killian, offered direct presidential access to scientists fundamentally antithetical to Teller, Lawrence, and Strauss. Not only did Sputnik provide "liberal" scientists renewed access to the White House, but the President's Science Advisory Committee also assured that new voices would join the internal debates over the Administration's nuclear testing and disarmament policies. Thus as Stassen's influence waned, Sputnik ironically created a new circle of eminent advisors who would soon be deeply involved in test ban negotiations.[45]

THE GAITHER REPORT

The President received bad news of another sort on November 7 when the Gaither Committee reported to one of the largest National Security Council meetings in history. The Gaither Committee had been appointed in the spring of 1957 shortly after the Federal Civil Defense Administration had recommended to the President that the United States spend $40 billion over several years to build shelters against nuclear attack. Acting through the National Security Council, the President asked H. Rowan Gaither, Jr., chairman of the board at both the Ford Foundation and the RAND Corporation, to head an ad hoc panel to evaluate the civil defense proposal in relation to larger defense and national security issues. Robert C. Sprague, a Massachusetts industrialist and an expert on continental defense, was named as co-director of the committee.[46]

According to one commentator, after the committee members had sifted through a mass of material, they concluded that the top echelons of the government did not know the full extent of the Soviet threat.[47] Actually, the exact opposite may have been the truth -- that by the fall of 1957, the corporate, scientific, and academic communities began to understand the President's deep concern about national security in the thermonuclear age.

Like the Killian report of 1955, the Gaither report stressed the vulnerability of the United States' deterrent, especially the strategic forces. Civil defense received secondary consideration from the Gaither committee, which concentrated on the danger of surprise attack on the Strategic Air Command and on the need to maintain an effective second-strike force. Sputnik, of course, heightened fears that the Russians had a significant lead in the deployment of intercontinental ballistic missiles (ICBM), against which the United States had no defense. The four years beginning in 1959 would be critical for the development of an ICBM deterrent and anti-missile defenses. Once the United States had regained its retaliatory advantage on which the deterrence doctrine depended, the committee recommended that the United States concentrate on assembling a conventional force capable of fighting limited wars. This approach would require a vastly increased defense budget, which Eisenhower was committed to keep under control.

Regarding the Federal Civil Defense Administration's original request to build bomb shelters, the Gaither committee recommended against constructing blast shelters and set as a first priority spending several hundred million dollars on shelter and civil defense research. As a secondary priority, the committee endorsed spending $22 billion on constructing fallout shelters.[48]

Eisenhower was not happy with the Gaither report, and complained to Dulles that it had been a mistake to call in an "outside group." Dulles agreed that such groups seldom took "a rounded view of the total situation," especially as it involved the Administration's attempt to control inflation in a sputtering economy. Eisenhower confided that he could not justify spending billions for shelters. For Dulles the issue was "largely a matter of temperament," and he was temperamentally unsympathetic to passive civil defense. Dulles believed that a strong offensive capability was the most effective deterrent. More importantly, the Gaither Committee had confined itself to military problems although the international struggle against Communism was not just military. Eisenhower found the Gaither report "useful," but he decided not to make it public on the grounds that advisory studies prepared for the President and the National Security Council ought to be kept confidential.[49]

NATO, MACMILLAN, AND A CRISIS OF CONFIDENCE

The collapse of the London disarmament talks, the acrimony of the United Nations debates, the reaction to Sputnik, the creation of the President's Science Advisory Committee, and the reception of the Gaither report all reflected a deepening crisis of confidence within the Administration. If the Gaither committee had raised questions about the vulnerability of United States' defenses, there remained the even larger question about the state of the Western alliance. In late October 1957, Macmillan hurried to Washington to review the NATO partnership with Eisenhower. Strauss, who stopped in London on his way home from a meeting in Vienna, had already laid much of the groundwork for the discussion.[50]

At the British embassy on Massachusetts Avenue, Dulles and Macmillan shared a grim view of the future. The Western allies who themselves did not possess nuclear weapons or technology were uncertain, bewildered, and frightened. Who would decide how nuclear weapons would be used in their defense? In addition, as the cost of the nuclear deterrent increased, there would be less and less capacity, and perhaps even less utility, in maintaining the original "shield" principle. Originally NATO had been conceived as a bulwark of ready divisions sufficient to defend Europe while the nuclear powers mounted their counterattack. But the concept had never been realized, and it was increasingly anachronistic in terms of cost and military strategy.[51]

In fact, the Americans and the British had no choice but to shore up the NATO alliance as best they could. One consequence of Sputnik was that the Administration gave renewed consideration to integrating tactical weapons, including intermediate range ballistic missiles, into the NATO forces. A first step would be to negotiate a military bilateral with the United Kingdom allowing Americans to share their nuclear weapons with the British. To do so, however, would require an amendment to the Atomic Energy Act. At the conclusion of his meetings with Macmillan, Eisenhower announced he would seek an amendment "to permit . . . close and fruitful collaboration of scientists and engineers of Great Britain, the United States, and other friendly countries." As Senator Anderson observed, Sputnik not only upset Americans' complacency about their role in space, but also their confidence in "winning" the arms race.[52]

Anderson and Durham on the Joint Committee were mystified, and just a little concerned, about what Eisenhower meant. Recalling the Klaus Fuchs spy case and the defection of Burgess and MacLean to the Soviet Union in 1951, they again raised questions about British security. Where would one draw the line between the British and other NATO allies in sharing nuclear weapon information? Strauss, who had consistently opposed sharing nuclear weapon information with the British, had a system: he would not give the British any information which the Russians did not already have. After Gerard Smith complained to Dulles that Strauss' restriction would nullify any agreement, Eisenhower privately assured Macmillan that he wanted genuine cooperation with the British. Strauss, feeling caught in the middle and very much embarrassed by Eisenhower, wondered if he should not resign. Dulles was quick to mollify Strauss by complimenting him on his skillful handling of a difficult matter.[53]

The extraordinary tension created by Sputnik also appeared in Dulles' attempt to enlist Adlai Stevenson in bipartisan support of the Administration's NATO policy. Dulles asked Stevenson to head a task force which would implement the President's plan for nuclear cooperation within NATO. Dulles shared with Stevenson NATO fears that the United States might misuse its nuclear power, or perhaps as bad, not use it at all in the defense of Europe. Appealing to Stevenson's altruism, Dulles foresaw a new international body which would control nuclear weapons "as a community asset and trust for the free world," rather than as a strictly national asset. Dulles would begin by creating a nuclear weapon stockpile for NATO as a way of assuring the allies that they could count on the United States in the face of the growing Soviet threat. At home, the Administration would not only have to amend the law, but also convince the Commission and the Department of Defense on the wisdom of trusting friendly powers with weapon information.

Stevenson was naturally wary of being compromised, and for four hours on the evening of October 30 he explored the matter privately with Dulles. He told Dulles frankly that he was unhappy with the Administration's emphasis on military preparedness over economic development. Furthermore, he thought the disarmament proposals were "unfair" to the Russians in that they had nothing to gain from reciprocal inspections. Like Stassen, Stevenson also favored an inspected test ban independent from a cutoff of weapon production. Stevenson did, however, agree to help Dulles prepare several study papers.[54]

Eisenhower's stroke on November 25, 1957 upset this unusual bipartisan project between Dulles and Stevenson. At lunch the following day, Strauss told Stevenson of the President's most recent illness, and relayed from Dulles that Eisenhower had only suffered a slight loss of speech. With a clear mind and no other impairments, Eisenhower planned to rest at Gettysburg for about three

weeks. Still, his participation in the forthcoming NATO summit was in doubt. If Eisenhower could not attend, Stevenson believed the NATO meetings should be held on the ministerial level and not at the summit with Vice President Nixon in Eisenhower's place. Stevenson continued to assist Dulles in the preparations up to the eve of the NATO summit, and then he quietly bowed out, in part because he felt unwanted, but no doubt also because he disagreed with much of the Republican foreign policy.[55]

World attention was focused on Paris. On November 28, Indian Prime Minister Nehru appealed to both Eisenhower and Khrushchev to end nuclear testing and the arms race. "No country, no people, however powerful they might be, are safe from destruction if this competition in weapons of mass destruction and cold war continues," Nehru wrote. Subsequently, on December 10, Bulganin, now a mere figure head for Khrushchev, wrote Eisenhower calling for a summit meeting on disarmament. In his letter, written less than a week before the convocation of the NATO conference, Bulganin also asked the United States and the United Kingdom to join the Soviet Union in a two to three-year test moratorium starting January 1, 1958. In an obvious attempt to strain the NATO alliance, Bulganin included a proposal to create a nuclear free zone in Western and Eastern Germany. The Bulganin letter seemed intended to embarrass Eisenhower prior to the NATO meeting, but it also served notice on the Western powers that the Soviet Union was willing to continue serious disarmament negotiations.[56]

It was evident from the American and British perspective that disarmament talks had reached a turning point after the collapse of the London Disarmament Conference, and well before Sputnik. But Sputnik had precipitated the emergency meeting between Eisenhower and Macmillan in late October when the heads of state met in Washington to search out a common front. The Soviet satellites cast a pall over the December NATO summit in Paris, but so did the faltering Western economies, the President's uncertain health, and the miserable weather.[57] One can only speculate on whether or how Sputnik influenced the Soviet decision to abandon the disarmament subcommittee.

From Eisenhower's perspective, the NATO summit was a success. Most importantly, he was able to attend, and to function normally. Each day confidence and mutual trust increased. In addition to agreements on nuclear warheads and intermediate range ballistic missiles for allied forces in Europe, the summit proposed a foreign minister's meeting with the Soviets to try to break the disarmament impasse. In principle, the NATO powers endorsed a controlled reduction of arms in Europe on the condition that the Soviet Union agree to adequate reciprocal inspections. They also decided to establish a group of scientists to advise on technical problems arising from proposals on arms control.[58]

Eisenhower's flexibility on disarmament was more fully revealed in his post-conference correspondence with Macmillan. The British continued to endorse the four-power London disarmament proposal, but Macmillan urged Eisenhower not to dig in his heels. The President had no intention of doing so, and he pointed to the NATO summit, which already indicated the West's willingness to talk. For the United Kingdom, the biggest obstacle to a test ban was the comparative inferiority of British nuclear weapons. For that reason Eisenhower wanted to amend the Atomic Energy Act so the British could have access to whatever weapon information was necessary. With parity, the British would have no reason to continue testing. In his belated response to Nehru, Eisenhower gave no indication that he would break the link between a test ban and a production cut-off. As he wrote to Nehru on December 15, "to do so could increase rather than diminish the threat of aggression and war."[59]

By the end of 1957 most of those in the President's inner circle agreed that the United States was in a weak position on disarmament and the test ban. Reports from the Paris NATO meeting, from an International Red Cross conference in India, and especially from the United Nations in New York all indicated that the continuing deadlock was eroding America's moral leadership in the West. Stassen, for one, believed that the time had come for the United States to advance new proposals.

STASSEN'S FINAL PROPOSAL

If Eisenhower was moving closer to Stassen's position on test ban and disarmament, he was also steadily losing confidence in his disarmament advisor. Only four days after Sputnik, Eisenhower had authorized Stassen to explore just how open the Soviets might be to inspections, cutoff of weapon production, and other aspects of the London proposals. Eisenhower was keeping his options open by signalling his own flexibility. Yet a few days later, he complained about the heavy expenses of Stassen's office - about $500,000 annually - and expressed the hope that Stassen would accept an appointment as ambassador to Greece. Dulles was frank in telling Stassen that he would welcome the change because Stassen was so badly out of step with Strauss, the Joint Chiefs of Staff, and the Department of Defense. Dulles did not include Eisenhower among those who opposed Stassen's initiatives, but the President solidly supported Dulles' determination to sack Stassen. Although Stassen played a small role in preparing for Macmillan's visit, he had little access to the White House after his return from London. Yet by the Christmas holidays, Dulles confided in Nixon that the Administration was heading for a "showdown" with Stassen when he presented a revised disarmament plan to the National Security Council on January 6, 1958.[60]

Stassen argued for three changes in the disarmament policy announced in London on August 29. All his proposals, he believed, would be acceptable to NATO. First, Stassen proposed dropping the linkage among the various disarmament proposals. The linkage, Stassen argued, was the major reason for the deadlock and only served to make the Americans appear intransigent. Second, he wanted to give the production cutoff a lower priority so that a twenty-four month test moratorium might become feasible. Finally, he suggested limited, confidence-building inspection zones for Europe, western Russia, Siberia, the Arctic, the Pacific Northwest, and western Canada with eight to twelve monitoring stations in both the United States and the Soviet Union. Stassen may have received some indication that the Soviets would be receptive to the new inspection plan. In any event, he believed his proposal would provide the basis for important first steps towards disarmament or a test ban.[61]

Unfortunately for Stassen, the Joint Chiefs of Staff, the Department of Defense, and the Commission were determined to stick by the August 29 proposals. Strauss presented the Commission's objections to a twenty-four month test moratorium, claiming that it would hurt both the development of the "clean" bomb and Plowshare, the peaceful uses program. Again, he stressed that the national laboratories would have great difficulty recovering from the negative effects of a test moratorium. Then speaking just for himself, Strauss objected to backing down from a sound disarmament position. He concluded by reporting that Teller and Lawrence believed that several score inspection stations, not a dozen, would be required to detect all tests in the Soviet Union.

Henry Cabot Lodge opened the way to further discussion when he supported Stassen's position. In responding to Lodge, Dulles revealed his own ambivalence about the United States' disarmament posture. The main obstacle to Western agreement on the issues was not NATO but the British and French, who opposed a

test moratorium unless the United States was willing to share information on nuclear weapons. Dulles also thought that the inspection zones proposed by Stassen would be politically unacceptable on all sides. At the same time, Dulles admitted that the United States had to consider public opinion. He worried that the United States could not retreat from the August 29 proposals without suffering a major propaganda defeat, but he acknowledged that the United States could not stand indefinitely on a rigid disarmament platform.

Eisenhower was as perplexed as Dulles. He agreed with Stassen and Lodge that public opinion was driving American disarmament policy. But without an amendment to the Atomic Energy Act allowing the United States to share its nuclear technology, Eisenhower predicted that NATO would collapse. He concurred with Dulles that the time was not ripe for new proposals requiring coordination with NATO. Although Eisenhower did not like Stassen's proposed inspection zones, neither did he believe that these proposals retreated from existing policy. Most puzzling to Eisenhower was the conflict between his scientific advisors, especially Teller and Rabi, with Strauss supporting one side and Stassen the other.

From his "back bench," Killian interrupted to report that the Science Advisory Committee had already organized a technical study on the impact of a test ban on United States and Soviet weapon programs, and on the feasibility of monitoring a test suspension. Eisenhower and Dulles were immediately interested. As Killian recalled, Dulles "had been looking for something to support his intuitive view that the United States should move toward a suspension of tests." Then and there, Eisenhower asked the National Security Council to sponsor the technical study on detecting nuclear tests. The President closed the meeting with the comment that the burden of the arms race hung heavy everywhere. For that reason, the United States should keep the world focused on nuclear disarmament.[62]

The National Security Council meeting on January 6 proved to be Stassen's "last hurrah" in the Eisenhower Administration. Perhaps more than anyone else on the President's staff, Stassen had worked to keep Eisenhower's test ban and disarmament options open. After the National Security Council ostensibly rejected his recommendations, Stassen knew he would have to resign. By February he was gone, but he had won a quiet victory. In its subsequent order which established the technical panel on disarmament under the chairmanship of Hans Bethe, the National Security Council noted the Administration's adherence to the August 29 Four-Power proposals "for the time being." That is, the Council would reexamine its policy should Congress amend the Atomic Energy Act allowing the United States to share its nuclear weapon information. The President and his advisors may not have realized it yet, but the Administration had forged, in effect, new linkages to a test suspension while greatly weakening the old. Obviously, it would be much easier to convince Congress to amend the Atomic Energy Act than it would be to negotiate a production cutoff with the Soviet Union.[63]

THE BETHE PANEL CONVENES

The year 1958 began with little public indication of the Administration's shifting views on disarmament. In his note to Nehru and in his public statements to NATO, Eisenhower had already indirectly told the Russians that the United States was sticking to its August 29, 1957, proposals. On January 12, in a letter to Bulganin, Eisenhower seemed to offer little more than a restatement of the August 29 principles. He agreed to meet with the Soviet leaders, but only after necessary groundwork had been laid at the ministerial level. Candidly, Eisenhower expressed his wariness of high level meetings, such as the

euphoric 1955 Geneva Summit, which created great expectations and subsequently disillusionment, dejection and even greater distrust. Eisenhower did, however, invite the Soviets to join American scientists in technical studies of the possibilities of verification and supervision of disarmament and test ban agreements.[64]

Eisenhower's proposal for technical studies with the Soviet Union was neither unprecedented nor original, but it obviously reflected the National Security Council's decision to authorize technical disarmament studies of its own. At the conclusion of the 1955 Peaceful Uses Conference, the United States and the Soviet Union had participated in a technical conference on the control of peaceful nuclear materials.[65] During the London conference in the summer of 1957, Britain's Selwyn Lloyd had advocated forming technical committees to study verification systems. Eisenhower's appointment of Killian as his science advisor, and his advocacy of international technical studies indicated his seriousness in pursuing disarmament. In the last analysis, any disarmament agreement would rest on its technical feasibility.[66]

Following the National Security Council meeting on January 6, Killian and Cutler selected an interagency committee, chaired by Hans Bethe, to conduct the technical disarmament studies. On the Bethe panel, as it was called, were representatives from the Atomic Energy Commission, the Department of Defense, the Central Intelligence Agency, and the missile panel of the President's Science Advisory Committee. In addition, the Bethe panel called on experts from the Los Alamos and Livermore weapon laboratories and from the Air Force Technical Applications Center. The State Department supplied observers. The Bethe panel focused on three major questions: (1) Could the United States detect both atmospheric and underground Soviet nuclear tests? (2) What were the comparative strengths of the Russian and American nuclear arsenals? and (3) What restrictions would a test ban place on the Commission's weapon laboratories?[67]

INTERNATIONAL PRESSURES FOR A TEST BAN

While the Bethe Panel launched its technical studies, international pressure for a test ban continued to mount. In Cairo, the Afro-Asian Solidarity Conference called for the end of nuclear testing. Shortly thereafter on January 13, Linus Pauling presented an anti-testing petition to the Secretary General of the United Nations. Pauling had now collected more than nine thousand signatures from forty-four countries, including 36 Nobel laureates, 101 members of the National Academy of Sciences, 35 fellows of the Royal Society of London, and 216 members and correspondents of the Soviet Academy of Sciences. Because the President had consulted personally with Teller, Pauling requested an appointment for himself. As if to punctuate Pauling's request, on February 1 the Council of the Federation of American Scientists advocated a ban on all testing, even of the smallest weapons.[68]

During the period scientific data on fallout was continuously published. In New York, the fourth session of the United Nation's Scientific Committee on the Effects of Atomic Radiation met from January 27 through February 28 to draft its final report. On the whole, the United States delegation headed by Shields Warren was satisfied that the report on somatic and genetic effects of radiation would refute many exaggerated claims about the hazards of radiation. With the exception of the report's conclusion, the Americans had striven successfully to keep "political" comments from the draft. When the Soviets sponsored a condemnation of testing for the conclusion, the United States succeeding in blocking the move by tabling that part of the report.[69]

The Bulletin of the Atomic Scientists devoted its entire January issue to "Radiation and Man," with reports from Libby and Austin Brues as well as an

article by Jack Schubert and Ralph Lapp. Under the aegis of Project Sunshine, J. Laurence Kulp and his associates from Lamont Laboratory, Columbia University, published new information on strontium-90 in the February issue of Science. Kulp and his colleagues concluded that the strontium-90 levels were not hazardous, but they also indicated that the levels of strontium 90 accumulated in human bones, specially children's, had risen measurably since 1956. Pauling then used the data to illustrate dramatically the cumulative millicuries of strontium-90 per square mile in New York City. Although not confirming Pauling's fears, General Alfred D. Starbird, the Commission's director of military application, forwarded to the Commission a warning from the division of biology and medicine that the Hardtack tests would produce more world-wide fallout than did Operation Redwing in 1956. Given the climate of world opinion, Commissioner Vance thought it unwise for the United States to conduct tests at levels so much higher than previous operations.[70]

HUMPHREY SUBCOMMITTEE

Perhaps the most significant pressure to end testing at this time came from Senator Hubert H. Humphrey's subcommittee on disarmament, which held hearings on the issue from February into April. As early as November 1957, Humphrey had written Eisenhower asking for a more flexible disarmament policy. After discussions with Stassen, Humphrey suggested that the United States declare its willingness to negotiate separately on a nuclear test ban with the only condition being agreement on an effective inspection system under United Nations administration. Humphrey was supported in his position by Senators Anderson and Stuart Symington, a former Secretary of the Air Force.[71]

Humphrey opened his hearings on February 28 with testimony from Stassen, who had only recently left the Administration. Although Humphrey could not prove it at the time, he suspected that Stassen merely repeated his National Security Council briefing for the benefit of the disarmament subcommittee. Officially, Stassen kept the Administration's confidence, but in substance his congressional testimony outlined his well known disarmament plans. There was hardly any secret about Stassen's views, or his optimism about the readiness of the Soviet Union to engage in serious disarmament negotiations.[72]

In subsequent hearings, the Humphrey subcommittee, with one exception, limited testimony to representatives of the Commission and its weapon laboratories, or to members of the Bethe panel. Strauss, Libby, Starbird, and Spofford G. English, acting deputy director of research, all defended the Administration's official policy linking a test ban to other disarmament issues. As they stated repeatedly, it was the manufacturing and stockpiling of nuclear weapons, not their testing, that threatened world peace. According to the Commission spokesman, a test ban would hurt the United States more than the Soviet Union because American testing emphasized the development of defensive weapons. Significantly, Humphrey did not call for testimony from either the State or Defense Departments, a fact which no doubt served to underline the Commission's increasing isolation on the disarmament question.[73]

Incredibly, in March 1958 both the Commission and the Russians strengthened the hands of the test ban advocates; the former inadvertently, the latter perhaps deliberately. On March 6 while Libby testified before the Humphrey subcommittee, the Commission announced that the maximum distance at which its seismological stations had detected the Rainier shot was only 250 miles. The implications, if true, were immediately evident, and appeared self-serving to the Commission's determination to keep testing. If detection of underground tests were so limited, policing an international test ban would be impossible.

During the ensuing controversy the Commission hastily revised its estimates to 2,300 miles, but the damage had been done. In the eyes of Senator Anderson and others, the Commission and Strauss had been discredited by an apparently deliberate attempt to falsify the Rainier data. Humphrey, however, was inclined to accept Libby's explanation that the error was an honest mistake made while Strauss was on vacation.[74] But even an exonerated Commission would now find it much more difficult to argue the technical difficulties of monitoring a test ban.

The Humphrey subcommittee provided Edward Teller and Hans Bethe still another arena in which to debate America's nuclear weapon policy. Although Bethe was a Nobel laureate, Teller, who had recently become director of the Livermore Laboratory, was no doubt better known to the general public. In February, Life magazine had published a preview of the book Our Nuclear Future by Teller and Albert Latter. In Life Teller and Latter also challenged Pauling and his "9,000" scientists who had petitioned the United Nations for a test ban. Before the Humphrey subcommittee, Teller repeated his familiar arguments for the need to test "clean" tactical weapons and to develop peaceful uses of nuclear explosives. Prophetically, he now raised questions about the reliability of detecting small underground tests and verifying a production cutoff in the Soviet Union. Perhaps unintentionally, Teller delivered a blow to the Administration's August 29 policy when he suggested that it might be more difficult to validate a production cutoff than it would be to monitor tests.[75]

Bethe's published testimony had been heavily censored, but it was clear in the published version that he acknowledged the difficulties of detecting both underground and high-altitude tests. He also agreed with Teller on the near impossibility of policing nuclear weapon stockpiles, although he was more optimistic about monitoring production. On the matter of testing, however, Bethe broke sharply with Teller and the Commission. Assuming that the United States was well ahead of the Russians in weapon design, variety, and stockpile, Bethe argued that a test ban would be greatly to the advantage of the United States. Bethe admitted that if the Soviets cheated on a test ban, they would eventually overtake the United States. But Bethe did not believe the Russians could violate the test ban without incurring unacceptable risks of being detected.[76] Although Humphrey repeatedly professed his objectivity, it was clear that he was pleased with Bethe's remarks.

The Commission became increasingly nervous about the mounting pressure for a test cessation. During the Humphrey subcommittee hearings, Ramey requested the Commission to prepare comments on a bill introduced in June 1957 by Congressman Charles O. Porter of Oregon, who was to become a major critic of the Hardtack tests. The bill would have halted United States testing as long as other countries refrained. Although Porter's bill stood little chance of passage, it irritated the Commission. Commissioner John S. Graham, who had replaced von Neumann in September 1957, described his own opinions on testing as "tentative." Commenting on the Porter bill, Graham concluded that it was not wise to prohibit testing through legislation, but that "some reasonable limitations on testing [were] so important that we should use every vehicle . . . to discuss these issues." At the Humphrey hearings Commissioners Graham, Floberg, and Libby agreed that disarmament and imminent test cessation were the most important issues facing the Commission.[77]

TEST BAN ALTERNATIVES

Even Strauss recognized that a new disarmament policy was inevitable. To complicate matters for the Commission, during the fall and winter of 1957-1958

Strauss moved to the periphery of the disarmament discussion, almost as a messenger among Eisenhower, Dulles, and the Congress. Shortly after the National Security Council meeting on January 6, Strauss presented Eisenhower with an idea he had discussed with Dulles. Strauss' new approach would retain the linkage between a test ban and a production cutoff. He advocated closing down all production plants to ease the inspection problem and disassembling existing weapons to provide fissionable material for power and other peaceful needs. The result would be a reduction of all nuclear weapon stockpiles. According to Strauss, Fields and Starbird agreed that the proposal could be "far more easily inspected" than earlier ideas. Strauss recommended trying the arrangement for three years, after which, if the agreement worked out, testing could be resumed "for peaceful purposes only." Eisenhower liked the idea and encouraged Strauss to pursue it.[78]

After reviewing sentiment in the United Nations and the Administration, even General Manager Fields acknowledged that the Commission should develop an acceptable fallback position. He appointed an ad hoc disarmament committee of senior Commission staff to propose alternative policies. The committee identified ten possible alternatives, or variations thereof, but no two committee members were able to agree on a single recommendation. From the committee's perspective, all alternatives had considerable disadvantages. The committee concluded, "Which one, therefore, is to be accepted is a function of how desperately we need make a new proposal and what we desire to achieve thereby: - taking a real disarmament step; making a proposal the Soviets might accept; making a proposal designed merely to give us propaganda advantage; or making a proposal to satisfy neutrals relative to fallout; or a combination of these."[79] The committee's note of desperation accurately depicted the Commission's frustration at being unable to maintain its grip on the Administration's disarmament policy.

The Commission's first priority, obviously, was to continue testing as long and as intensely as possible. Starbird outlined plans to conduct a harbor excavation experiment in Alaska in 1959. Furthermore, he predicted that in the near future the United States would adopt a policy of continuous testing, perhaps conducted completely underground. Libby enthusiastically endorsed greatly increasing underground testing. Yet even the possibility that the Commission might save the testing program by moving it underground was coolly received by Fields, who noted several limitations which could never be overcome -- the primary limitation being the inability of testing complete weapon systems underground.[80]

THE BETHE PANEL REPORTS

While the Commission searched ineffectively for a solution to the disarmament dilemma, the Bethe panel proceeded to evaluate the technical feasibility of monitoring a test suspension, and the comparative losses to the United States and the Soviet Union as a result of test cessation. Given the interagency composition of the committee, the Bethe panel reached rather modest conclusions by late March 1958. The Commission's representatives who signed the report found little reason to complain. The Bethe panel described "a practical detection system" which would identify nuclear explosions in the Soviet Union, except for very small underground shots. The system would require observation stations, mobile ground units, and rights to fly over parts of the Soviet Union. The panel did not recommend suspension of the Hardtack tests and conceded that a test ban would result in some deterioration of the weapon laboratories. The United States, according to the panel, could benefit from additional testing -- especially "clean" and small, inexpensive weapons. Finally, the

panel was not able to estimate whether a test ban would be to the net military advantage of the United States.[81]

It was clear that Bethe's thinking, supported by Herbert Scoville of the Central Intelligence Agency, dominated the panel. Starbird and Loper were in firm opposition even to the panel's moderate report, but the Department of Defense failed to take a strong stand on the military consequences of a test ban although in a separate action, Quarles forwarded Maxwell D. Taylor's objection to breaking the disarmament linkage. As a result, the Bethe panel left the door open for the President's Science Advisory Committee to make its own estimate on the comparative consequences of a test ban.[82]

THE SOVIET UNILATERAL TEST SUSPENSION

The second boost for the test ban advocates in March came from the Soviet Union. On March 31, after completing one of the most intensive test series in history, the Supreme Soviet announced it would suspend all Russian atomic and hydrogen weapon tests and appealed to the United States and United Kingdom to do likewise. From the American perspective, the Soviet announcement was a cynical, yet brilliant, propaganda ploy. Since the autumn of 1957 the Russians had been testing at an unprecedented rate, sometimes detonating two or more shots in a single day, so that global fallout levels had risen sharply by the spring of 1958. Bethe even speculated before the Humphrey subcommittee that the Russians had rushed to finish their tests before the United States began the Hardtack series. Nevertheless, the Soviet action won worldwide acclaim, especially in Asia and Africa.[83]

The United States was not caught unawares, but that fact hardly blunted the impact of the Russian announcement. On March 24, Eisenhower met with his senior advisors to work out a response to the impending Soviet declaration. Secretary Dulles suggested that the President beat the Russians to the punch by immediately announcing that the United States would suspend all testing for two years after the Hardtack series. Strauss and the Department of Defense representatives were strongly opposed. They warned that the NATO allies would conclude that the United States was frightened. On second thought, Dulles agreed that Macmillan and Adenauer could be embarrassed if an apparently panicked United States were to play into the hands of its political enemies. Strauss now offered the plan which he had discussed with the President in February: a two-year test suspension and production cutoff accompanied by a pledge to reduce weapon stockpiles by using the nuclear material "to meet the needs of a power-hungry world." The trouble with Strauss' proposal was that it too would require prior consultation with the NATO allies. It was frustrating that even though the Americans knew the Russian announcement was imminent, there was nothing the Administration could do about it.

Although stymied over how to soften the Russians' propaganda blow, Eisenhower drew renewed resolve from the incident. For the first time in their history, he reflected, Americans were really "scared" by the tremendous power of nuclear weapons. For Eisenhower, it was "simply intolerable" for the United States to lose its moral leadership of the Free World. For one thing, he speculated, the United States could confine its testing underground. For another, if Congress amended the Atomic Energy Act and the Soviets accepted inspection, a nuclear test suspension would be inevitable. Whatever the outcome, he directed his defense and security advisors "to think about what could be done to get rid of the terrible impasse in which we now find ourselves with regard to disarmament." The Administration was now on notice that the President would soon revamp the United States' disarmament and test ban policies.[84]

Eisenhower met with the National Security Council on April 4 to discuss the Bethe panel's report. Noting that some areas of the Soviet Union have more than 140 earthquakes a year, Eisenhower asked Bethe whether underground tests in the 10-megaton range could be distinguished from earthquakes. Bethe could not provide a definitive answer, but he estimated that seismologists could tell the difference most of the time. Dulles was surprised that as many as thirty check-points would be required in the Soviet Union, and wondered how many would be needed in the United States. Bethe thought perhaps fifteen. What if, Dulles interjected, the Soviets wanted to include all of the Western Hemisphere? Dulles was also skeptical that the Russians would accept the proposed over-flights. Bethe did not think the number of check-points was critical so long as some kind of mobile inspection team could insure against cheating. Again Eisenhower voiced his worry about the tension gripping the free world over the nuclear testing issue. In the President's judgment, the United States faced a steady psychological erosion of its leadership on disarmament.[85]

In this climate of mounting gloom over America's ability to provide moral leadership to the Western alliance, Khrushchev asked Eisenhower to join the Soviet Union in a test cessation that would ease the fears of "all strata of society, from political personages, scientists, and specialists to ordinary people, the rank-and-file workers of city and village, to mothers of families." Gallingly, Khrushchev cited Pauling's United Nations petition signed by scientists from the United States and the Soviet Union as a testament against allowing continued nuclear tests, "thereby causing harm to the health of people throughout the entire world and threatening the normal development of coming generations." Hastily, Dulles prepared a presidential reply, which was little more than a holding action. In addition to the old formulas, the President's note repeated his January 12 proposal that technicians from both countries work cooperatively to develop workable control measures. To reporters, Dulles explained that the Soviet unilateral declaration was propaganda, pure and simple. Because the Russians knew of the planned Hardtack series, their promise to stop testing only if others followed suit was a transparent ploy requiring no self-denial or even any hesitation in their own testing program. Nevertheless, by summarizing the Bethe panel's conclusions, Dulles also signaled that the Administration had its own technicians hard at work searching for an acceptable disarmament policy.[86]

When Eisenhower met with reporters on April 9, he had already reviewed his position on disarmament with Dulles. To questions about the Bethe panel and Killian's group, he replied with the characteristic vagueness that he often used with the press. But when asked directly whether he would consider a test suspension if the scientific reports were favorable, he answered "Yes" without hesitation. In fact, he said he might even suspend tests unilaterally. Strauss was flabbergasted and immediately called Dulles to find out if the President and the Secretary of State were in collusion on the testing issue. Dulles assured Strauss that nothing was prearranged with the President. Angrily, Strauss complained that he was having great difficulty keeping "his ducks in a row." No doubt he was also upset that Killian and Bethe were steadily gaining influence within the President's inner circle.[87]

That same week the President's Science Advisory Committee met in Puerto Rico to evaluate the Bethe panel report. On the question of the comparative military advantage of a test suspension, the Killian committee filled the void left by the Bethe panel by concluding that an end to testing by both sides would "freeze the edge" the United States had in nuclear weapon technology. The committee did not challenge the need to complete the Hardtack series but believed that it would be in the United States' interest to break the linkage

binding a test ban to other disarmament proposals. Finally, given the controversy over the reliability of technical detection systems, the Science Advisory Committee recommended further studies of monitoring techniques, perhaps in cooperation with the Soviets.[88]

THE COMMITTEE OF PRINCIPALS

To provide guidance for a possible summit meeting, Eisenhower established a special cabinet committee consisting of Dulles, as chairman, along with Strauss, Secretary of Defense Neil H. McElroy, and Secretary of the Treasury George Humphrey. In turn, on April 7 the White House appointed a committee of principals, a working group on disarmament policy comprising the Secretaries of State and Defense, the chairman of the Atomic Energy Commission, the director of the Central Intelligence Agency, and the President's science advisor. With Dulles in command, the State Department prepared a revision of the disarmament policy paper approved by the National Security Council on June 11, 1957. The paper was to serve as a guide for the subsequent discussions.[89]

The principals labored through the middle of April without reaching agreement on specific new United States initiatives on disarmament. In general they found the United States' policy was adequate in scope and objective, but they differed on whether the various components of American disarmament policy could be separated. Consequently, United States policy appeared complex, rigid, and vulnerable before world opinion. The Department of State, the Central Intelligence Agency, and Killian's group favored a separate, inspected test ban. The Commission, on the other hand, indicating that it was bending, proposed a limitation on testing, rather than an outright ban. According to the Commission's formula, atmospheric tests would be limited to 20 per year having no greater yield than 100 kilotons each, while underground tests would be unrestricted. The Commission also continued to insist that a test limitation agreement be linked to some other disarmament measure, although not necessarily a production cutoff. The Defense Department remained noncommital in the discussion.[90]

On his return from Puerto Rico, Killian met personally with Strauss to review his committee's recommendations. Strauss was surprised that Killian presented the views of the entire committee, not just the Bethe panel. Killian quickly got to his major contention: that because the United States was technically ahead in weapons, a mutual test suspension would be to the advantage of the United States. Bluntly, Strauss told Killian he could not agree. Although Americans believed they were ahead, Strauss was not convinced. In any event, the United States' lead was only relative based on the development of smaller, lighter weapons. Because the United States was a democracy, Strauss argued, it was a defender nation, not an aggressor like the Soviet Union. Thus while the Soviets could concentrate on the development of large thermonuclear warheads, the United States would have to develop more sophisticated weapons. Historically, he continued, with the advent of new weapons, countermeasures were always devised but sometimes lagged for years. Strauss conceded that a test ban seemed attractive, but with "defensive atomic weapons . . . in their infancy" an end to testing "would be purchased at an intolerable cost to our security." According to Strauss, Killian was surprised, shaken, and uncertain as to what to do next.[91]

Killian's confusion, no doubt, was short lived, especially after his April 17 meeting with Eisenhower from whom he received encouragement for the Science Advisory Committee's recommendations. Killian hoped that the United States could suspend testing after the Hardtack series, but conscientiously he reported the continued opposition of the Commission and the Defense Department. The

President confided in Killian that he had not been very impressed, or even convinced, by the pleas of Teller, Lawrence, and Mills for continued testing of "clean" and defensive weapons. Obviously, similar justifications from Strauss and Quarles were also wearing thin. Again, on April 22, Khrushchev wrote Eisenhower a long, stentorian letter in which he reviewed all past differences over disarmament and piously concluded with a call to "put an end to polemics on this subject."[92] This time, with advice and assistance primarily from Dulles, the President would be ready with a different reply for the Russian premier.

DULLES' DISARMAMENT ADVISORS

At his home on April 26, Dulles convened a critical meeting of his four personal disarmament advisors and the committee of principals. Dulles' advisors, all close friends of Eisenhower, included General Alfred M. Gruenther, former NATO commander; Robert A. Lovett, Truman's Secretary of Defense; John J. McCloy, civilian head of German occupation; and General Walter Bedell Smith, Eisenhower's former chief-of-staff. Dulles set the tone in his opening remarks which stressed the urgency to do something to erase the widely held image of the United States as a militaristic nation. In Dulles' opinion, the continued military emphasis probably caused the United States to lose more friends than the gain from small technical military advances was worth. The United States, he said, now had no choice but to demonstrate the nation's interest in peace and arms control.

Dulles reviewed the various elements of the disarmament package. On testing, he summarized the views of the Science Advisory Committee, the Commission, and the Department of Defense. He also observed that the British were not only committed to complete their scheduled 1958 tests, but also would not give up testing unless American weapon technology could be made available through an amendment of the Atomic Energy Act. On the production cutoff, Dulles reluctantly reported that the Strauss proposal for cannibalizing stockpiles for fissionable materials was dead. Strauss and Quarles repeated their objections to a test ban, while Killian reviewed the recommendations of the Science Advisory Committee. None of Dulles' four advisors took a clear cut stand for or against a test suspension. Indeed, they appeared to believe that suspension was a foregone conclusion. The forum was ideal for Dulles, however, because it enabled him to set a new course for the Administration without obtaining the formal concurrence of the Commission and the Defense Department through the National Security Council.[93]

Following his Saturday conference, Dulles worked rapidly on a reply to Khrushchev's latest note. By Monday, April 28, 1958, he had drafted Eisenhower's response. "The United States is determined that we will ultimately reach an agreement on disarmament," the President wrote. While he reiterated the United States' concerns for a production cutoff, a stockpile reduction, a test cessation, "open-skies," and the peaceful use of outer space, Eisenhower merely alluded to the "interdependence" of these issues without insisting upon their linkage. Rather, he stressed the need for technical studies of inspection and control, such as those called for by the United Nations General Assembly. Technical studies on test detection, for example, could serve as a vital first step to a political agreement. Significantly, the President made no mention of technical studies relative to production cutoff, and left vague whether the United States was still bound to the August 29 disarmament proposals.[94]

PLANNING FOR HARDTACK

While the Eisenhower Administration re-evaluated its disarmament policies, the Commission continued its planning for Operation Hardtack at the Enewetak

Proving Ground. On January 31, 1958, Eisenhower had approved modified plans for Hardtack which included several tests of various missile warheads. In the aftermath of Sputnik, the Commission and the Department of Defense considered these tests essential, but the two agencies disagreed on the advisability of two high-altitude shots. Strauss vehemently opposed detonating the high-altitude shots because the tests might blind the islanders on nearby atolls. After the experience of Castle/Bravo the Commission did not want to risk another test fiasco. More importantly, mindful of the United States' role as United Nations' trustee for the islands, Strauss believed that it would be immoral to gamble with the health and safety of the Marshallese. He maintained that the cost of moving the two shots southwestward to Johnson Island would be minimal compared to the risks of testing at Enewetak. Despite Killian's support of the Defense Department, Quarles was unable to overrule Strauss' objections when they met with Dulles, McElroy, and Twining on April 7. The extra cost and delay notwithstanding, the two shots were eventually moved to Johnson Island.[95]

No sooner had agreement been reached on the Johnson Island tests than the Department of Defense proposed three additional high-altitude tests in a new series named Argus, to be fired 300 miles over the South Atlantic. The principal purpose of the Argus tests, scheduled for August and September 1958, was to test the "Christofilos effect," in which electrons from high-altitude bursts were captured by the earth's magnetic field resulting in some interference with radio, radar, and other communication systems. Eisenhower approved the additional Argus series on May 1, significantly with the concurrence of the Commission, the Departments of Defense and State, and Killian.[96]

The weapon laboratories also pushed hard to accelerate the testing programs through the spring and summer of 1958. With the prospect of a moratorium for two or more years, the laboratories stepped up experiments and expenditures wherever possible. When Eisenhower approved Hardtack, he had deferred a decision on an underground series for the Nevada Test Site during the fall of 1958. With continued pressure from the laboratories and the Commission, Eisenhower finally approved the underground series, originally called Millrace, on June 13. As the test suspension became more and more a certainty, the Commission and Defense carried forward requests for additional shots including balloon, tunnel, and safety tests in Nevada. The testing pace became so frenetic that Eisenhower did not finally approve Hardtack II, as the series was now called, until late summer.[97]

DEMONSTRATIONS AGAINST TESTING

As the government intensified its weapon experiments, protestors also intensified their efforts to halt testing. On the twelfth anniversary of the bombing of Hiroshima, a small Quaker group calling itself the "Committee for Non-Violent Action Against Testing" set up camp outside the gates of the Nevada Test Site near Mercury. By twos and threes the protestors attempted to enter the test site, but were stopped by the sheriff of Nye County, who arrested them for trespassing. Later that fall, small groups of pacifists and political activists formed the National Committee for a Sane Nuclear Policy, ultimately simply called SANE. In 1958 SANE was especially active in lobbying the Humphrey subcommittee for a Congressional test ban resolution. Tactically, the leaders of SANE decided to focus their energies on the testing issue, rather than to confront the entire disarmament question.[98]

In February 1958, Strauss received reports that Lawrence Scott and the Committee for Non-Violent Action planned to sail to the Pacific Proving Ground in hopes of stopping the Hardtack tests. The voyage of the Golden Rule would

obviously be symbolic with no chance of actually halting the shots. Nevertheless, by actually putting themselves at risk, the crew hoped to remind the world of the Lucky Dragon's fate, and thus quicken the world's conscience. The Golden Rule did not sail further than a mile and a half from Honolulu before it was detained by the Coast Guard on May 1. Although largely ignored by the Commissioners, the "voyage" of the Golden Rule succeeded in capturing public and press attention.[99]

Less dramatically, but more personally, the Committee for Non-Violent Action brought its protest to the Commission itself. On May 7, a group of pacifists led by David Dellenger and Theodore Olson walked into the lobby of the new Commission headquarters building in Germantown, Maryland, to announce that they would remain there fasting until they could speak to the Commissioners. Among the group were the wife and child of a crewman on the Golden Rule and a protestor who had fallen ill and failed to catch the boat before it left California. No doubt the demonstrators expected to be arrested for trespassing, but to mute publicity the Commission decided they could stay in the lobby or the adjacent auditorium indefinitely. Strauss even provided cots, blankets, a telephone, and washroom for the group. Sandwiches, coffee, and soft drinks were offered, and the protestors, newsmen, guards, and employees eventually became friendly. Still, Dellenger and his colleagues pledged to maintain their fast and vigil in the lobby until they could speak personally to the Commissioners.

For a week they waited. First, Graham volunteered to see the group on behalf of the Commission. The meeting was cordial, but not satisfactory for Dellenger. The demonstrators decided to hold out, in part to learn the fate of their family and friends on the Golden Rule, but mostly because they wanted to present their views to the entire Commission, or at least to Strauss.

Finally, Strauss agreed to talk with the group in one of history's most unusual confrontations between anti-war protestors and a government official. Appealing to the moral force of the Christian-Judaic tradition, and to the non-violent principles of Ghandi, the pacifists asked Strauss and the Commission to abandon their preparations for nuclear war. For the most part, the exchange continued on this high moral and ethical level. Strauss' conscience was moved, and he reflected that prior to World War II when he was in the banking business he had refused, on moral grounds, to invest in either munitions or distillery businesses. But the subsequent holocaust of World War II had convinced him that only America's great nuclear deterrent had saved the world from Communist domination.

The demonstrators disagreed, claiming that a nation under God should not have fought even against the Nazis. Strauss was non-plussed, and the courtly southern Jew rhetorically asked whether the Civil War which freed the slaves was justified. No, replied one of the northern pacifists, "the body is nothing" and only the freedom of the spirit mattered. Indeed, the blacks might have been freer had there not been a Civil War. No American war, not even the Revolution, had been justified. If the Commission could not by itself end nuclear testing, then mindful of the Nuremberg trials, the pacifists stated that Strauss and everyone who worked for the Commission should resign.

Here the dialog virtually ended. Unknown to the demonstrators, Strauss had already resigned, and so with some irony he noted that America was still a free country; that Commission employees could work wherever they wanted; but that most worked for the government out of a sense of duty as citizens. Not surprisingly, the confrontation ended inconclusively, albeit amicably. Within weeks, Dellenger and his friends were back in Washington, D.C., to protest in front of the White House, and to rally near the Washington Monument where Pauling demanded an end to nuclear testing.[100]

UNDERGROUND TESTING: A REFUGE

By May 1, 1958, even the most ardent supporter of nuclear defense knew that the days of atmospheric testing were numbered. Thus while the protestors camped in the lobby of the Germantown headquarters building, the general advisory committee met in the Commission's Washington offices to discuss the future of nuclear weapons. Although Defense officials continued to support the Commission over the President's Science Advisory Committee, the Commission asked the general advisory committee: "How completely could our weapons program go forward if we were to be limited to underground tests only?" For two days the general advisory committee wrestled with that issue.[101]

Edward Teller took the lead in pressing the committee to consider what the effects of a test moratorium after Hardtack would be upon the laboratories, the Commission, and the United States. Although Teller thought a complete moratorium would have serious consequences, he ventured that "an intermediate position" which included underground, high-altitude, and a limited number of atmospheric peaceful tests might actually be desirable. Because absolute verification of a test ban would be impossible, Teller wanted the general advisory committee to endorse a position which would allow the development of peaceful nuclear explosives and anti-ballistic missile warheads.

Speaking from the perspective of the President's Science Advisory Committee was James B. Fisk, a prominent physicist and former director of research at the Commission. Fisk emphasized the "broad" issues relating to a test moratorium. First, something would have to be done to calm public fears over atmospheric contamination. More importantly, Fisk viewed "some kind of test moratorium" as an initial step in reducing world tensions and stopping the arms race. Fisk had to leave, however, before the advisory committee adopted Teller's proposals for confining all tests underground with the exception of limited peaceful "ditch-digger" and anti-missile tests. "The Committee is unanimously agreed that to go any farther than this in the restriction of testing would seriously endanger the security of the United States."[102]

Events were moving quickly on May 14 when Strauss met with the President. Already on May 9 Khrushchev had accepted Eisenhower's invitation to join technical disarmament studies. With Macmillan due to visit Washington in early June to confer on an exchange of nuclear weapon information, among other things, the prospects of a test moratorium were even more certain. The President and Strauss spoke briefly on the status of peaceful uses, whereupon Eisenhower asked Strauss to be his special advisor on Atoms for Peace under Dulles in the State Department following his term as chairman of the Commission. Strauss was delighted, especially if that meant he would remain within the "NSC family." On disarmament, Strauss reported that the general advisory committee was completely at variance with the conclusions of the Killian report, particularly on the matter of the superiority of American nuclear weapons. According to the committee, American defensive systems were not so advanced as Soviet offensive weapons. Eisenhower listened but offered no comment.[103]

Strauss gave Dulles a copy of the general advisory committee's report the following day. If the suspension of atmospheric tests following Hardtack was politically necessary, Strauss hoped that testing could be moved underground. Dulles commented that the British, too, would like to end testing by phases so that they could continue to develop "small" weapons of less than one megaton. Much depended on whether Congress approved an amendment to the Atomic Energy Act to permit exchanging weapon data with the British. Dulles also expressed his regret on Strauss' pending retirement from the Commission. With the President, Dulles encouraged him to become "ambassador-at-large" on Atoms-for-Peace matters.[104]

On May 24, Eisenhower wrote Khrushchev to propose convening the technical disarmament conference in Geneva within three weeks of the Soviets' acceptance of the invitation. He suggested inviting scientists from the United Kingdom, France, and other nations having experts on detecting nuclear tests. Eisenhower stressed the importance of selecting scientists "chosen on the basis of special competence, so as to assure that we get scientific, not political, conclusions." To minimize political maneuvering, he suggested that the conference draft an initial progress report within thirty days, and prepare its final report within sixty days. When Khrushchev accepted on May 30, asking that Czechoslovakia, Poland, and India be included in the conference, the stage was set for the conference of experts (with the exception of India) to convene in Geneva on July 1.[105]

With the President now moving resolutely toward a moratorium and technical discussions of methods of policing such an agreement, the Commission made one more effort to keep open the option of underground testing. On May 28, the Commissioners met with laboratory representatives to discuss limiting weapon tests to underground shots. Commissioner Graham reviewed the recent events, including the reports of the general advisory committee and the advisory committee on biology and medicine. General Starbird asked the laboratory directors what technical problems were involved and what limitations would result should the Commission decide to test underground only.

Again taking the lead, Teller responded that scientists at Livermore had concluded that nearly all required information could be obtained from underground tests and that they were easier to conduct than atmospheric tests. Even without an international moratorium, Teller was in favor moving almost all tests underground, with exception of those for weapon effects and anti-missile systems, which had to be atmospheric. He proposed to limit the amount of radioactive material released into the atmosphere by each nation to that produced by one-tenth of a megaton of fission weapons annually. He also noted that the development of peaceful nuclear explosives would be hampered by abandoning atmospheric testing.

Duane C. Sewell of Livermore saw considerable advantages to testing underground. It would allow the laboratories greater flexibility in scheduling tests, and thus accelerate the development of new weapons. Instead of waiting for the annual test series, which was subject to the vagaries of weather, continuous underground testing would allow laboratory scientists to experiment when they were ready. Sewell envisioned that more radical weapon designs could be tested because the failure of an experiment would not be so important. Rather than waiting another year, the test would simply be rescheduled. Sewell predicted significant cost savings as well, particularly if the Commission eliminated the expensive bi-annual tests at the Pacific Proving Ground. According to Sewell, the costs of digging the tunnel for the Rainier shot was no more than the cost of a five-hundred-foot tower. Furthermore, the cost of additional tunnels would be about one-fourth the cost of the original. Finally, public opposition to tests because of the fallout danger could be eliminated by underground testing.

Norris Bradbury and Alvin C. Graves from Los Alamos were not as sanguine as their Livermore colleagues about the advantages of underground testing, but even Bradbury was not certain that the final "proof-test" of a missile system and its warhead was "absolutely necessary" if the two could be adequately tested separately. Although the Commissioners did not at this time actually decide to abandon atmospheric testing, the laboratory scientists, and particularly Teller and Sewell, had assured themselves them that they could move all tests underground with little sacrifice to the weapon program.[106]

Within the atomic energy establishment underground testing seemed a viable, and perhaps preferable, alternative to a moratorium or an outright ban on nuclear tests. Eisenhower, however, was not ready to accept that easy solution. Five years in the White House had taught him that compromises of this kind merely postponed the realization of his fervent hopes to remove the nuclear threat that hung over the world. Underground testing might help the situation if a moratorium or test ban proved impossible, but in the meantime the President focused his attention on the technical conference of experts, soon to convene in Geneva, Switzerland. Perhaps the scientists could cut through the political tangle and determine whether a limitation on tests was technically feasible.

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25. Strauss to Eisenhower, Nov. 23, 1957, Jan. 29, June 12, 1958, all in AEC; Department of Energy, "Announced United States Nuclear Tests, July 1945 Through December 1982," Jan. 1983, NVO-209 (Rev. 3), pp. 8-9.

26. Public Papers, 1957, Eisenhower, pp. 468-80; Western Statement in the Disarmament Subcommittee on Nuclear Test Suspension, July 2, 1957, Documents on Disarmament, 1945-1959, Vol. II, 1957-1959 (Department of State Publication 7008), pp. 802-03 (hereafter cited as Documents on Disarmament).

27. Stassen to Dulles, June 20, 1957, DDE; Dulles, Memorandum of Conversation with British Ambassador Sir Harold Caccia, June 23, 1957, DOS.

28. Bernhard G. Bechhoefer, Postwar Negotiations for Arms Control (Washington: The Brookings Institution, 1961), pp. 407-08 (hereafter cited as Bechhoefer, Postwar Negotiations for Arms Control); Dulles, Telephone Call to Allen Dulles, July 8, 1957, DDE; J. G. Mein, Memorandum of Conversation, July 12, 1957, DOS.

29. Dulles, Memorandum of Conversation with the President, July 22, 1957; Strauss to Eisenhower, July 23, 1957, both in DDE.

30. Bechhoefer, Postwar Negotiations for Arms Control, pp. 406-407; Dulles to Herter, July 30, 31, 1957, DDE; Smith to Strauss, Aug. 12, 1957, DOS; Western Working Paper Submitted to the Disarmament Subcommittee: Systems of Inspection to Safeguard Against the Possibility of Surprise Attack, Aug. 2, 1957, and Statement by Secretary of State Dulles to the Disarmament Subcommittee, Aug. 2, 1957, Documents on Disarmament, pp. 837-45; Dulles to Herter for Eisenhower, July 31, 1957, DDE.

31. Dulles, Memorandum of Conversation with the President, Aug. 3, 1957, DDE; Strauss to File, Aug. 8, 1957, LLS.

32. Cutler, Morning Conference on Aug. 9, 1957, DOS.

33. Cutler, Afternoon Conference on Aug. 9, 1957, DOS; Smith Telephone Call to the Secretary in Utica (en route to Watertown, N.Y.), Aug. 9, 1957, DDE.

34. Smith to Strauss, Aug. 15, 1957, LLS.

35. Statement by the President After Authorizing Inclusion of Nuclear Test Suspension Among Disarmament Proposals, Aug. 21, 1957, Public Papers, 1957, Eisenhower, p. 627; Dulles, Memorandum of Conversation with the President, Aug. 21, 1957, DDE.

36. Bechhoefer, Postwar Negotiations for Arms Control, pp. 408-13; Smith, Telephone Conversation with Stassen, Aug. 28, 1957; Spiers, Telephone Conversation with Stassen, Aug. 28, 1957, both in DOS; Public Papers, 1957, Eisenhower, pp. 635-36; Dulles, Telephone Call from Strauss, Aug. 30, 1957, DDE.

37. Western Working Paper Submitted to the Disarmament Subcommittee: Proposals for Partial Measures of Disarmament, Aug. 29, 1957, Documents on Disarmament, pp. 868-74; Divine, Blowing on the Wind, pp. 155-56.

38. Divine, Blowing on the Wind, p. 159; Bechhoefer, Postwar Negotiations for Arms Control, pp. 433-34; Harold K. Jacobson and Eric Stein, Diplomats, Scientists, and Politicians: The United States and the Nuclear Test Ban Negotiations (Ann Arbor: University of Michigan Press, 1966), p. 17 (hereafter cited as Jacobson and Stein, Diplomats, Scientists, and Politicians); New York Times, Oct. 14, 1957.

39. Jacobson and Stein, Diplomats, Scientists, and Politicians, pp. 28-29; Bechhoefer, Postwar Negotiations for Arms Control, pp. 413-14; Memorandum by the Soviet Government on Partial Measures in the Field of Disarmament, Sept. 20, 1957, Documents on Disarmament, pp. 874-84.

40. Dulles, Speech delivered to the United Nations 680th Plenary Meeting, Official Records of the General Assembly, Twelfth Session: Plenary Meetings (New York: United Nations, 1957), pp. 18-21; Dulles to Eisenhower, Sept. 16, 1957; Eisenhower to Dulles, Sept. 17, 1957; Dulles to Macmillan, Sept. 19, 1957, all in DDE.

41. Stassen to Dulles, Informal Memorandum, Sept. 23, 1957, DDE.

42. Dulles to Stassen, Sept. 27, 1957, DDE.

43. Strauss to Dulles, Sept. 28, 1957; Quarles to Dulles, Sept. 30, 1957; Twining to Dulles, Sept. 30, 1957; Dulles, Telephone Call to Eisenhower, Sept. 27, 1957; Dulles to Eisenhower, Oct. 1, 1957; Dulles, Memorandum of Conversation with Vice President Nixon, Sept. 30, 1957, all in DDE.

44. Bechhoefer, Postwar Negotiations for Arms Control, pp. 413-439; Jacobson and Stein, Diplomats, Scientists, and Politicians, pp. 21-24.

45. Public Papers, 1957, Eisenhower, pp. 789-99; Gilpin, American Scientists and Nuclear Weapons Policy, pp. 176-77; James R. Killian, Jr., Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology (Cambridge: The MIT Press, 1977), pp. 2-30 (hereafter cited as Killian, Sputnik, Scientists, and Eisenhower); Jacobson and Stein, Diplomats, Scientists, and Politicians, pp. 32-33. Initial members of the science advisory committee were Robert F. Bacher, William O. Baker, Lloyd V. Berkner, Hans A. Bethe, Detlev W. Bronk, James H. Doolittle, James B. Fisk, Caryl P. Haskins, James R. Killian, George B. Kistiakowsky, Edwin H. Land, Emanuel R. Piore, Edward M. Purcell, Isidor I. Rabi, H. P. Robertson, Jerome B. Wiesner, Herbert F. York, and Jerrold R. Zacharias.

46. Seven members of the President's Science Advisory Committee had previously served on the Gaither Committee or one of its sub-committees. They were: Jerome B. Wiesner, James H. Doolittle, James B. Fisk, James R. Killian, I. I. Rabi, Lloyd V. Berkner, and Herbert F. York.

47. Morton H. Halperin, "The Gaither Committee and the Policy Process," World Politics 13 (Oct. 1960-July 1961), 360-384 (hereafter cited as Halperin, "The Gaither Committee").

48. Joint Committee on Defense Production, Deterrence and Survival in the Nuclear Age (The 'Gaither Report of 1957'), Joint Committee Print (Washington: Government Printing Office, 1976); Halperin, "The Gaither Committee," pp. 361-369; Freedman, The Evolution of Nuclear Strategy, pp. 160-163; Kaplan, The Wizards of Armageddon, pp. 129-32.

49. Dulles, Memorandum of Conversation with the President, Dec. 26, 1957, DDE; Eisenhower, Waging Peace, 1956-1961 (Garden City, NY: Doubleday, 1965), pp. 219-23 (hereafter cited as Eisenhower, Waging Peace).

50. Dulles to Eisenhower, Sept. 29, 1957, DDE; Strauss to File, Oct. 9, 1957, LLS.

51. Dulles, Memorandum of Conversation at the British Embassy, Oct. 22, 1957, DDE.

52. Public Papers, 1957, Eisenhower, pp. 768-72; Clinton P. Anderson, Outsider in the Senate: Senator Clinton Anderson's Memoirs (New York: The World Publishing Company, 1970), p. 168 (hereafter cited as Anderson, Outsider in the Senate); Harold L. Nieburg, Nuclear Secrecy and Foreign Policy (Washington: Public Affairs Press, 1964), pp. 137-38.

53. Anderson, Outsider in the Senate, p. 168; Dulles, Telephone Call from Smith, Oct. 26, 1957; Dulles, Telephone Call from Strauss, Oct. 26, 1957, both in DDE.

54. Dulles, Telephone Call to Stevenson in Chicago, Oct. 28, 1957; Dulles, Memorandum of Conversation with Governor Stevenson, Secretary's Residence, Oct. 30, 1957, both in DDE.

55. Dulles, Telephone Call to Strauss, Nov. 26, 1957; Dulles, Memorandum of Conversation with Governor Stevenson, Nov. 26, 1957, both in DDE. Correspondence relating to this episode can be found in Walter Johnson, Carol Evans, and C. Eric Sears eds., The Papers of Adlai E. Stevenson, Vol. 7, Continuing Education and the Unfinished Business of American Society, 1957-1961 (Boston: Little, Brown, 1977), pp. 96-137.

56. Statement by the Indian Prime Minister (Nehru) on Nuclear Test Explosions, Nov. 28, 1957, and Letter From the Soviet Premier (Bulganin) to President Eisenhower, Dec. 10, 1957, Documents on Disarmament, pp. 917-26.

57. Eisenhower, Waging Peace, p. 231. Divine, Blowing on the Wind, pp. 172-173, suggests that Sputnik caused only a temporary setback on a test ban.

58. Communiqueé by the North Atlantic Council [Extract], Dec. 19, 1957, Documents on Disarmament, pp. 928-31; Eisenhower, Waging Peace, p. 232.

59. Eisenhower, Memorandum on letter of Prime Minister Macmillan dated 1/2/1958, Jan. 3, 1958, DDE; Public Papers, 1957, Eisenhower, pp. 832-34.

60. Dulles, Memorandum of Conversation, Oct. 8, 1957; Dulles, Memorandum of Conversation with the President, Oct. 18, 1957; Dulles, Memorandum of Conversation with Governor Stassen, Secretary's Residence, Oct. 20, 1957; Stassen to Dulles, Oct. 21, 1957; Dulles, Memorandum of Conversation with Governor Stassen, Oct. 31, 1957; Dulles, Telephone Call to Nixon, Dec. 26, 1957, all in DDE.

61. National Security Council, Summary of Discussion, Meeting 350, Jan. 6, 1958, (hereafter cited as SNSC) DDE

62. Killian, Sputnik, Scientists, and Eisenhower, p. 154; SNSC 350, Jan. 6, 1958, DDE.

63. James S. Lay, Jr., Memorandum for the National Security Council: U.S. Policy on Control of Armaments, Jan. 9, 1958; CM 1324, Jan. 8, 1958, both in AEC. Numerous documents in the Dulles papers concerning Stassen's last months in the Administration remained closed to research at the Eisenhower Presidential Library.

64. Eisenhower to Bulganin, Jan. 13, 1958, Public Papers of the Presidents of the United States, 1958: Dwight D. Eisenhower (Washington: Government Printing Office, 1959), pp. 75-84 (hereafter cited as Public Papers, 1958, Eisenhower).

65. See Chap. 11, pp. 9-16.

66. Killian, Sputnik, Scientists, and Eisenhower, pp. 150-152.

67. Commission representatives were: Brig. Gen. Alfred Starbird, Carson Mark, Harold Brown, and Roderick Spence. Department of Defense representatives were General Herbert Loper, Maj. Gen. Richard C. Coiner, and Colonel Lester Woodward. The CIA representative was Herbert Scoville, Jr. Doyle Northrup also represented the Department. Representatives from the Science Advisory Committee were: Hans Bethe (chairman) and Herbert York. Representing the missile committee of PSAC were George Kistiakowsky, J. W. McRea, Herbert York, L. Hyland, and Robert F. Bacher. Designation of Members of Various Working Groups--NSC Meeting on Jan. 6, 1958, AEC 226/131, Jan. 23, 1958, AEC; Killian, Sputnik, Scientists, and Eisenhower, pp. 154-55.

68. Jacobson and Stein, Diplomats, Scientists, and Politicians, p. 34; Pauling to Eisenhower, Feb. 19, 1958, LLS.

69. Report of U.S. Delegation to the Fourth Session of the UN Scientific Committee on the Effects of Atomic Radiation, AEC 226/139, April 30, 1958, AEC.

70. Bulletin of the Atomic Scientists 14 (Jan. 1958), 9-61; Walter R. Eckelmann, J. Laurence Kulp, and Arthur R. Schulert, "Strontium-90 in Man, II," Science, Feb. 7, 1958, pp. 266-274; Pauling, No More War!, p. 102; CM 1280, May 1, 1957, AEC. See also Divine, Blowing on the Wind, pp. 184-97.

71. Humphrey to Eisenhower, Nov. 4, 1957; Eisenhower to Humphrey, Nov. 8, 1957, both in DDE; Jacobson and Stein, Diplomats, Scientists, and Politicians, p. 35.

72. Senate Subcommittee of the Committee on Foreign Relations, Hearings on Control and Reduction of Armaments, Feb. 28-April 17, 1958 (Washington: Government Printing Office, 1958), pp. 1336-64 (hereafter cited as Hearings on Control and Reduction of Armaments).

73. Ibid., pp. 1365-615; Jacobson and Stein, Diplomats, Scientists, and Politicians, pp. 43-44.

74. AEC Press Release, Background Information on the Deep Underground Shot (Rainier) at the Nevada Test Site, March 6, 1958; AEC Press Release A-53, Libby to Humphrey, March 12, 1958; JCAE, Transcript of Hearings on Erroneous Statement in Press Release of March 6, 1958, Issued by AEC, Concerning Rainier Underground Atomic Detonation, March 15, 1958, all AEC; Hearings on Control and Reduction of Armaments, pp. 1584-98; Gilpin, American Scientists and Nuclear Weapons Policy, p. 182.

75. Edward Teller and Albert Latter, "The Compelling Need for Nuclear Tests," Life, Feb. 10, 1958, pp. 65-72; Teller and Latter, Our Nuclear Future. . . Facts Dangers and Opportunities (New York: Criterion Books, 1958); Hearings on Control and Reduction of Armaments, pp. 1453-60.

76. Ibid., pp. 1526-43.

77. Comments on H.R. 8269 - A Bill to Prohibit Testing of Nuclear Devices, AEC 226/134, March 18, 1958; AEC 226/136, April 2, 1958; AEC 226/138, April 21, 1958; Graham to McCool, March 25, 1958; Graham to Commissioners, April 23, 1958; Graham to Durham, May 23, 1958; J. H. Morse, Jr., to Graham, March 3, 1958; Morse to Floberg, March 3, 1958; Morse to Libby, March 10, 1958, all in AEC.

78. Goodpaster, Memorandum of Conference with the President, Jan. 22, 1958, DDE.

79. Test Limitations, AEC 226/132, Feb. 24, 1958; CM 1337, Feb. 26, 1958, both in AEC.

80. CM 1340, March 7, 1958; Further Information Relative to Underground Testing, AEC 987/1, March 14, 1958, both in AEC.

81. Report of NSC Ad Hoc Working Group on the Technical Feasibility of a Cessation of Nuclear Testing, March 28, 1958, AEC.

82. Taylor to the Secretary of Defense, March 13, 1958; Quarles to Bethe, March 21, 1958, both in AEC; Morse to Strauss, May 2, 1958, LLS.

83. Decree of the Supreme Soviet Concerning the Discontinuance of Soviet Atomic and Hydrogen Weapons Tests, March 31, 1958, Documents on Disarmament, pp. 978-80; Hearings on Control and Reduction of Armaments, p. 1545; Jacobson and Stein, Diplomats, Scientists, and Politicians, p. 45.

84. Dulles, Memorandum of Conversation with the President, March 24, 1954; Goodpaster, Memorandum of Conference with the President, March 24, 1958, both in DDE.

85. SNSC 361, April 4, 1958, DDE.

86. Khrushchev to Eisenhower, April 4 and 8, 1958, and Eisenhower to Khrushchev, April 8, 1958, Documents on Disarmament, pp. 980-85; Secretary Dulles' News Conference of April 1, 1958, AEC; Secretary's Staff Meeting, April 1 and 8, 1958, both in DOS.

87. The President's News Conference of April 9, 1958, Public Papers, 1958, Eisenhower, pp. 294-304; Dulles, Telephone Call to Eisenhower, April 8, 1958; Dulles, Telephone Call from Strauss, April 9, 1958, DDE.

88. Killian, Sputnik, Scientists, and Eisenhower, pp. 156-157; Jacobson and Stein, Diplomats, Scientists, and Politicians, p. 49; Divine, Blowing on the Wind, p. 209.

89. Foster, Memorandum to the Secretary, Review of Existing Disarmament Policy, April 10, 1958, AEC.

90. President's Special Cabinet Committee on Summit Preparations - Report of Working Group on Disarmament, AEC 226/137, April 17, 1958, AEC.

91. Strauss to File, April 16, 1958, LLS.

92. Goodpaster, Memorandum of Conference with the President, April 17, 1958, DDE; Khrushchev to Eisenhower, April 22, 1958, Documents on Disarmament, pp. 996-1004.

93. Memorandum of Conversation, Meeting with Disarmament Advisors, April 26, 1958, DDE.

94. Eisenhower to Khrushchev, April 28, 1958, Documents on Disarmament, pp, 1006-07.

95. Strauss to Eisenhower, Jan. 29, 1958; CM 1351, April 4, 1958; CM 1352, April 7, 1958, all in AEC; Strauss to File, April 3 and 7, 1958, both in LLS.

96. Goodpaster, Memorandum of Conference with the President, May 1, 1958, DDE; CM 1359, April 21, 1958, AEC.

97. Letter to the President Regarding Test Activity, AEC 987/8, Sept. 2, 1958, AEC.

98. Morse Salisbury to Starbird, Action on United Press coverage of protestor groups at the Nevada Test Site, Aug. 7, 1957, AEC; Divine, Blowing on the Wind, pp. 160, 165-69, 178-81.

99. CM 1334, Feb. 12, 1958, AEC; Earle Reynolds, The Forbidden Voyage (New York: David McKay, 1961).

100. CM 1369, May 6, 1958; CM 1371, May 9, 1958; CM 1372, May 9, 1958; Meeting between Chairman Strauss and Members of National Committee for Non-Violent Action Against Nuclear Tests, May 13, 1958, all in AEC; Lewis L. Strauss,

Men and Decisions (Garden City, NY: Doubleday, 1962), p. 413; Divine, Blowing on the Wind, p. 214.

101. GAC 58, May 5, 7, 1958; Quarles to Eisenhower, May 9, 1958; Loper to Strauss, May 8, 1958, all in AEC.

102. GAC 58, May 5, 7, 1958, AEC.

103. Goodpaster, Memorandum of Conference with the President, May 14, 1958, DDE; Khrushchev to Eisenhower, May 9, 1958, Documents on Disarmament, pp. 1036-41.

104. Dulles, Memorandum of Conversation with Strauss, May 16, 1958, DDE.

105. Eisenhower to Khrushchev, May 24, 1958; Khrushchev to Eisenhower, May 30, 1958; Eisenhower to Khrushchev, June 10, 1958, all in Documents on Disarmament, pp. 1043-44, 1050-51, 1051-52.

106. CM 1377, May 28, 1958, AEC.

TABLE 0

PERSONNEL

UNITED STATES ATOMIC ENERGY COMMISSION

NAME		FROM	TO
Gordon Dean	Chairman	July 11, 1950	June 30, 1953
Lewis L. Strauss	Chairman	July 2, 1953	June 30, 1958
Henry DeWolf Smyth		May 30, 1949	Sept. 30, 1954
Thomas E. Murray		May 9, 1950	June 30, 1957
Thomas Keith Glennan		Oct. 2, 1950	Nov. 1, 1952
Eugene M. Zuckert		Feb. 25, 1952	June 30, 1954
Joseph Campbell		July 27, 1953	Nov. 30, 1954
Willard F. Libby		Oct. 5, 1954	June 30, 1959
John Von Neumann		Mar. 15, 1955	Feb. 8, 1957*
Harold S. Vance		Oct. 31, 1955	Aug. 31, 1959*
John S. Graham		Sept. 12, 1957	June 30, 1962
John F. Floberg		Oct. 1, 1957	June 23, 1960
John A. McCone	Chairman	July 14, 1958	Jan. 20, 1961
John H. Williams		Aug. 13, 1959	June 30, 1960
Robert E. Wilson		Mar. 22, 1960	Jan. 31, 1964
Loren K. Olson		June 23, 1960	June 30, 1962

* Date deceased in Office

TABLE 1

JOINT COMMITTEE ON ATOMIC ENERGY

83rd CONGRESS (1953 - 1954)

W. STERLING COLE, CHAIRMAN
BOURKE B. HICKENLOOPER, VICE-CHAIRMAN

Senator	Bourke B. Hickenlooper	Iowa
Senator	Eugene D. Millikin	Colorado
Senator	William F. Knowland	California
Senator	John W. Bricker	Ohio
Senator	Guy R. Cordon	Oregon
Senator	Richard B. Russell	Georgia
Senator	Edwin C. Johnson	Colorado
Senator	Clinton P. Anderson	New Mexico
Senator	John O. Pastore	Rhode Island
Representative	W. Sterling Cole	New York
Representative	Carl Hinshaw	California
Representative	James E. Van Zandt	Pennsylvania
Representative	James T. Patterson	Connecticut
Representative	Thomas A. Jenkins	Ohio
Representative	Carl T. Durham	North Carolina
Representative	Chet Holifield	California
Representative	Melvin Price	Illinois
Representative	Paul J. Kilday	Texas

Executive Directors	William L. Borden
	Corbin C. Allardice

TABLE 2

JOINT COMMITTEE ON ATOMIC ENERGY

84th CONGRESS (1955 - 1956)

CLINTON P. ANDERSON, CHAIRMAN
CARL T. DURHAM, VICE-CHAIRMAN

Senator	Clinton P. Anderson	New Mexico
Senator	Richard B. Russell	Georgia
Senator	John O. Pastore	Rhode Island
Senator	Albert Gore	Tennessee
Senator	Henry M. Jackson	Washington
Senator	Bourke B. Hickenlooper	Iowa
Senator	Eugene D. Millikin	Colorado
Senator	William F. Knowland	California
Senator	John W. Bricker	Ohio
Representative	Carl T. Durham	North Carolina
Representative	Chet Holifield	California
Representative	Melvin Price	Illinois
Representative	Paul J. Kilday	Texas
Representative	W. Sterling Cole	New York
Representative	John J. Dempsey	New Mexico
Representative	Carl Hinshaw	California
Representative	James E. Van Zandt	Pennsylvania
Representative	James T. Patterson	Connecticut
Executive Directors	Corbin C. Allardice	
	James T. Ramey	

TABLE 3

JOINT COMMITTEE ON ATOMIC ENERGY

85th CONGRESS, (1957 - 1958)

CARL T. DURHAM, CHAIRMAN
CLINTON P. ANDERSON, VICE-CHAIRMAN

Senator	Clinton P. Anderson	New Mexico
Senator	Richard B. Russell	Georgia
Senator	John O. Pastore	Rhode Island
Senator	Albert Gore	Tennessee
Senator	Henry M. Jackson	Washington
Senator	Bourke B. Hickenlooper	Iowa
Senator	William F. Knowland	California
Senator	John W. Bricker	Ohio
Senator	Henry C. Dworshak	Idaho
Representative	Carl T. Durham	North Carolina
Representative	Chet Holifield	California
Representative	Melvin Price	Illinois
Representative	Paul J. Kilday	Texas
Representative	John J. Dempsey*	New Mexico
Representative	W. Sterling Cole**	New York
Representative	James E. Van Zandt	Pennsylvania
Representative	James T. Patterson	Connecticut
Representative	Thomas A. Jenkins	Ohio
Executive Director	James T. Ramey	

*Wayne Aspinall was appointed March 17, 1958, to fill vacancy created by death of John J. Dempsey on March 11, 1958.

**Craig Hosmer was appointed January 15, 1958, to fill the vacancy created by resignation of Sterling Cole on December 1, 1957, to become Director General of the IAEA.

TABLE 4

JOINT COMMITTEE ON ATOMIC ENERGY

86th CONGRESS, (1959 - 1960)

CLINTON P. ANDERSON, CHAIRMAN
CARL T. DURHAM, VICE-CHAIRMAN

Senator	Clinton P. Anderson	New Mexico
Senator	Richard B. Russell	Georgia
Senator	John O. Pastore	Rhode Island
Senator	Albert Gore	Tennessee
Senator	Henry M. Jackson	Washington
Senator	Bourke B. Hickenlooper	Iowa
Senator	Henry C. Dworshak	Idaho
Senator	George D. Aiken	Vermont
Senator	Wallace F. Bennett	Utah
Representative	Carl T. Durham	North Carolina
Representative	Chet Holifield	California
Representative	Melvin Price	Illinois
Representative	Wayne N. Aspinall	Colorado
Representative	Albert Thomas	Texas
Representative	James E. Van Zandt	Pennsylvania
Representative	Craig Hosmer	California
Representative	William H. Bates	Massachusetts
Representative	Jack Westland	Washington

Executive Director — James T. Ramey

TABLE 6

GENERAL ADVISORY COMMITTEE

Isidor I. Rabi Chairman, 1952 - 1956	Dec. 12, 1946 - Aug. 01, 1956
Oliver E. Buckley	Aug. 02, 1948 - Aug. 01, 1954
Williard F. Libby	Aug. 07, 1950 - Sept. 30, 1954 May 26, 1960 - Aug. 01, 1962
Egar V. Murphree	Aug. 07, 1950 - Aug. 01, 1956 Apr. 04, 1957 - Aug. 01, 1964
Walter G. Whitman	Aug. 07, 1950 - Aug. 01, 1956
John von Neumann	Feb. 27, 1952 - Aug. 01, 1954
James B. Fisk	Sept. 22, 1952 - Aug. 01, 1958
John C. Warner	Sept. 22, 1952 - Aug. 01, 1964
Eugene P. Wigner	Sept. 22, 1952 - Nov. 19, 1956 Dec. 03, 1959 - Aug. 01, 1962
Jesse W. Beams	Oct. 23, 1954 - Aug. 01, 1960
Edwin M. McMillen	Sept. 23, 1958 - Oct. 07, 1958
Warren C. Johnson Chairman, 1956 - 1959	Oct. 23, 1954 - Aug. 01, 1960
Kenneth S. Pitzer Chairman, 1960 - 1961	Oct. 27, 1958 - Aug. 01, 1964
T. Keith Glennan	Oct. 26, 1956 - Sept. 12, 1958
Edward Teller	Oct. 26, 1956 - July 09, 1958
Robert E. Wilson	Oct. 26, 1956 - Mar. 22, 1960
James W. McRae	Oct. 29, 1958 - Feb. 02, 1960
Manson Benedict	Oct. 29, 1958 - Aug. 01, 1962

TABLE 7

MILITARY LIAISON COMMITTEE

CHAIRMAN

Robert LeBaron	Oct. 01, 1949 -	Aug. 01, 1954
Herbert B. Loper	Aug. 02, 1954 -	July 14, 1961

ARMY MEMBERS

Brig. Gen. Harry McK. Roper	Aug. 21, 1952 -	Aug. 26, 1955
Colonel Kenner F. Hertford	Nov. 01, 1952 -	Oct. 05, 1954
Brig. Gen. John P. Daley	Oct. 05, 1954 -	Oct. 01, 1958
Brig. Gen. Thomas M. Watlington	Aug. 26, 1955 -	Dec. 29, 1955
Major Gen. John S. Upham	Dec. 29, 1955 -	July 13, 1956
Major Gen. John E. Theimer	July 13, 1956 -	Sept. 15, 1956
Brig. Gen. Dwight E. Beach	Sept. 15, 1956 -	July 01, 1959
Major Gen. William W. Dick	Oct. 01, 1958 -	July 11, 1960
Brig. Gen. John T. Snodgrass	July 01, 1959 -	July 18, 1961
Colonel Walter T. Kerwin, Jr.	July 11, 1960 -	Sept. 01, 1960
Brig. Gen. David C. Lewis	Sept. 01, 1960 -	July 09, 1962

NAVY MEMBERS

Captain James S. Russell	Apr. 18, 1952 -	Apr. 05, 1954
Rear Adm. George C. Wright	Nov. 18, 1952 -	Sept. 26, 1955
Captain Paul H. Ramsey	Apr. 05, 1954 -	Dec. 13, 1955
Rear Adm. Courtney Shands	Sept. 26, 1955 -	Dec. 27, 1956
Rear Adm. David L. McDonald	Dec. 13, 1955 -	Oct. 24, 1957
Captain James H. Flatley, Jr.	Oct. 24, 1957 -	Mar. 25, 1958
Rear Adm. G. Serpell Patrick	May 10, 1957 -	Mar. 17, 1958
Captain Joseph A. Jaap	Mar. 17, 1958 -	Sept. 23, 1958
Captain Joseph D. Black	Mar. 25, 1958 -	Nov. 25, 1958
Captain Frederick L. Ashworth	Sept. 23, 1958 -	July 02, 1959
Rear Adm. William E. Ellis	Nov. 25, 1958 -	Dec. 28, 1959
Captain Harold G. Brown	July 02, 1959 -	Sept. 21, 1959
Captain John N. Shafer	Sept. 21, 1959 -	Feb. 08, 1961
Rear Adm. C. S. Cooper	Dec. 28, 1959 -	Apr. 26, 1960
Rear Adm. Frank A. Brandley	Apr. 26, 1960 -	Apr. 16, 1962

AIR FORCE MEMBERS

Major Gen. H. G. Bunker	Oct. 03, 1951 -	Oct. 29, 1954
Major Gen. J. E. Briggs	Mar. 05, 1952 -	May 02, 1954
Major Gen. H. B. Thatcher	May 03, 1954 -	Sept. 24, 1956
Brig. Gen. Richard T. Coiner, Jr	Oct. 29, 1954 -	Aug. 01, 1958
Major Gen. John S. Mills	Sept. 24, 1956 -	July 03, 1958
Major Gen. Leland S. Stranathan	July 03, 1958 -	May 29, 1959
Major Gen. Charles H. Anderson	Aug. 01, 1958 -	May 15, 1960
Major Gen. Marvin C. Demler	May 29, 1959 -	Nov. 23, 1959
Brig. Gen. Paul T. Preuss	Nov. 23, 1959 -	Mar. 28, 1960
Brig. Gen. Ralph L. Wassell	Mar. 28, 1960 -	Nov. 01, 1962
Major Gen. Bruce K. Holloway	May 15, 1960 -	Oct. 10, 1961

TABLE 20

LABORATORY DIRECTORS

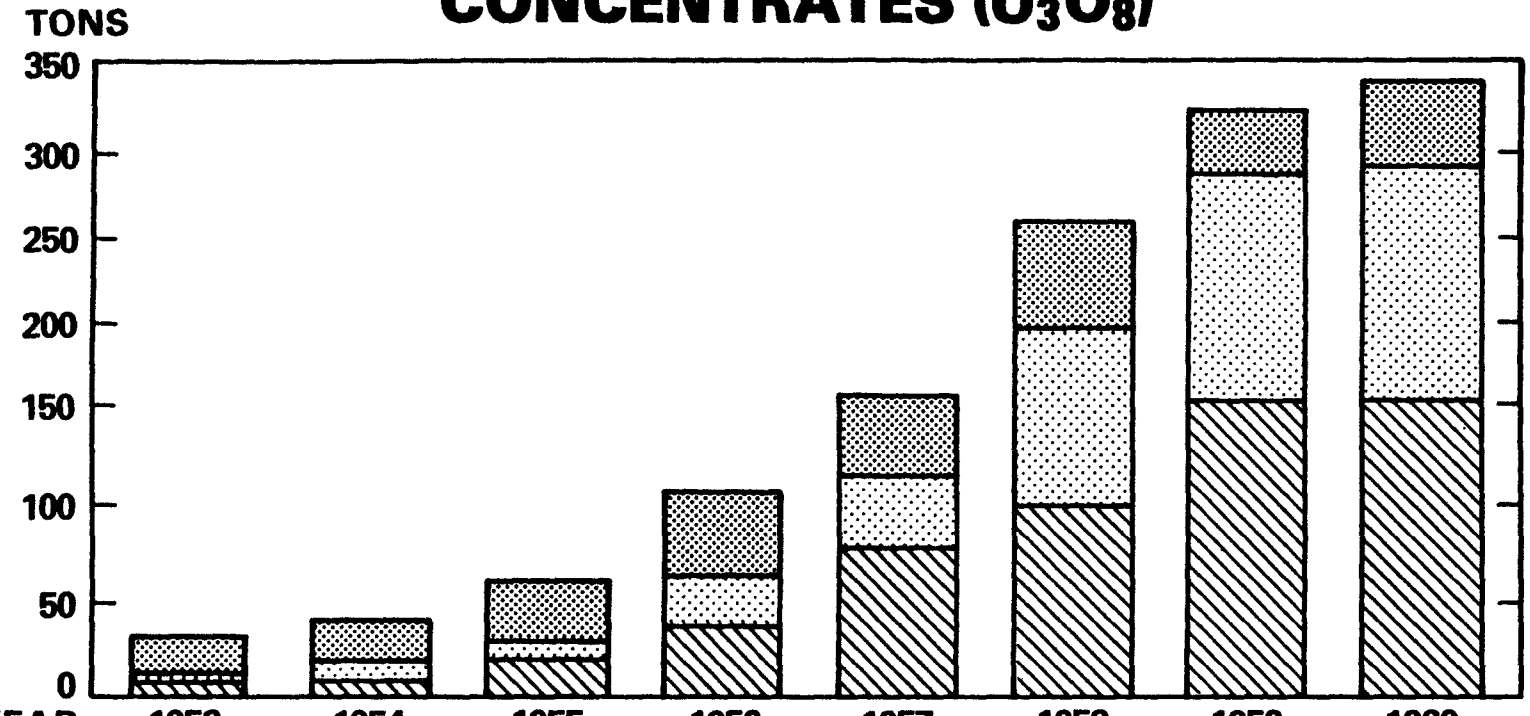
(1953-1960)

UNITED STATES ATOMIC ENERGY COMMISSION

AMES LABORATORY		
	Frank H. Spedding	1948-1968
ARGONNE NATIONAL LABORATORY		
	Walter H. Zinn	1946-1956
	Norman Hilberry	1957-1961
BROOKHAVEN NATIONAL LABORATORY		
	Leland J. Haworth	1948-1961
LOS ALAMOS SCIENTIFIC LABORATORY		
	Norris E. Bradbury	1945-1970
OAK RIDGE NATIONAL LABORATORY		
	Clarence E. Larson	1950-1955
	Alvin M. Weinberg	1955-1974
RADIATION LABORATORY-BERKELEY		
	Ernest O. Lawrence	1936-1958
	Edwin M. McMillan	1958-1973
SANDIA LABORATORY*		
	Donald A. Quarles	1952-1953
	James W. McRae	1953-1958
	Julius P. Molnar	1958-1959
	Siegmund P. Schwartz	1960-1965
LIVERMORE LABORATORY		
	Herbert F. York	1952-1958
	Edward Teller	1958-1960

* The actual title was president not director.

PROCUREMENT OF URANIUM CONCENTRATES (U_3O_8)

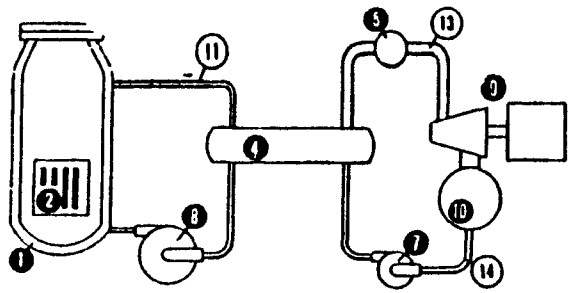


FISCAL YEAR	1953	1954	1955	1956	1957	1958	1959	1960
DOMESTIC	990	1,450	2,140	4,200	7,580	10,245	15,160	16,565
CANADA	220	690	830	1,590	3,370	9,475	13,505	13,445
OVERSEAS	1,685	2,550	2,970	4,650	5,210	6,655	4,660	4,570
TOTAL TONS	2,900	4,690	5,940	10,440	16,160	26,375	33,325	34,580

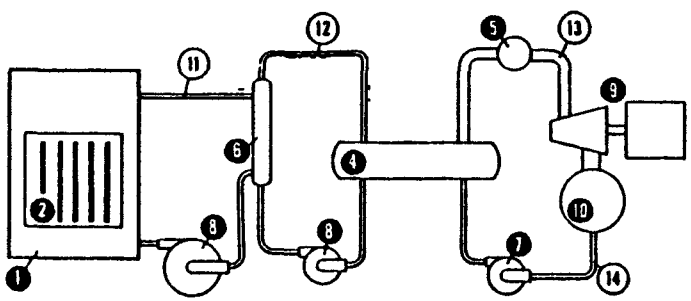
SOURCE: USAEC, MAJOR ACTIVITIES IN THE ATOMIC ENERGY PROGRAMS, JANUARY - DECEMBER 1961

APPENDIX 5

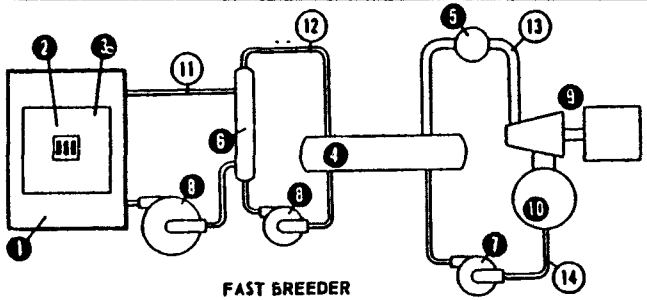
EIGHT BASIC REACTOR SYSTEMS BEING DEVELOPED



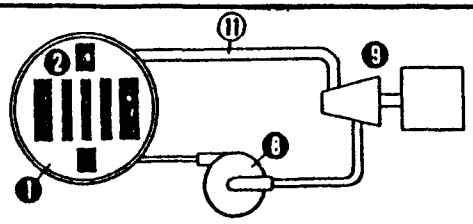
PRESSURIZED WATER



SODIUM GRAPHITE



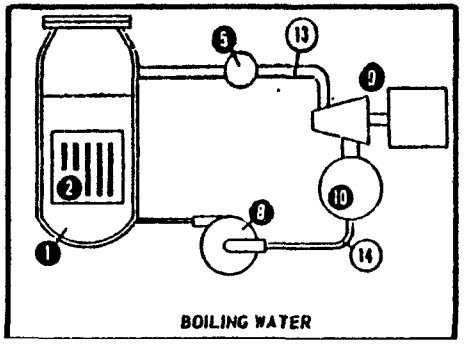
FAST BREEDER



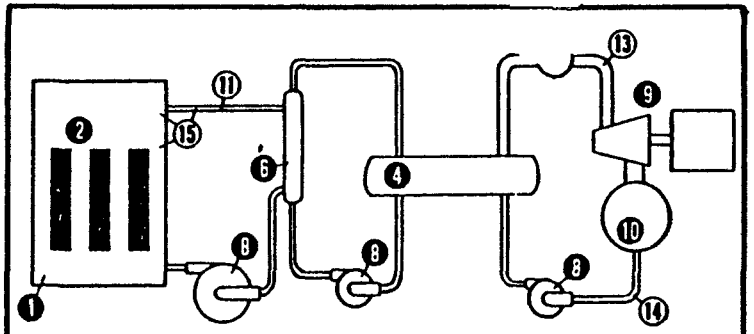
HIGH TEMPERATURE GAS COOLED FOR GAS TURBINE

FEATURES

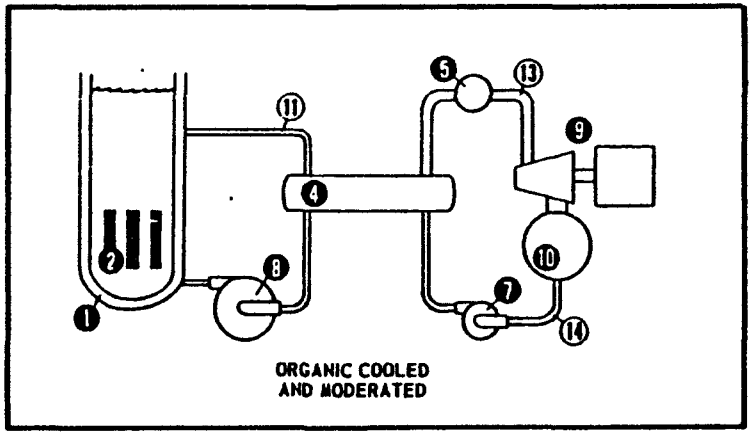
1. REACTOR
2. CORE
3. BLANKET
4. BOILER
5. STEAM DRIER
6. INTERMEDIATE HEAT EXCHANGER
7. FEEDWATER PUMP
8. CIRCULATING PUMP
9. TURBOGENERATOR
10. CONDENSER
11. PRIMARY COOLANT
12. INTERMEDIATE COOLANT
13. STEAM
14. CONDENSATE
15. CIRCULATING FUEL



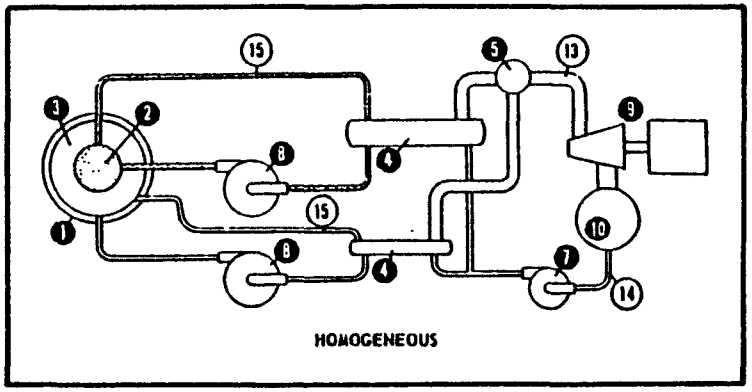
BOILING WATER



LIQUID METAL FUELED



ORGANIC COOLED AND MODERATED



HOMOGENEOUS

ATOMIC ENERGY FACTS
September, 1957